THE ENGINEERING AND MINING JOURNAL.

RICHARD P. ROTHWELL, C. E., M. E.
ROSSITER W. RAYMOND, Ph. D. } Editors.

NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

CONTENTS.

EDITORIALS:
The Meeting of the Institute—The Metric System 133
Duty-Trials of Pumping Engines..... 133
Technical Instruction for Workmen.... 134
The Increased Product of Bessemer Works..... 134
Action of Acids on Minerals..... 134
The Prices of Iron and Steel Rails in England for 20 years 135
Refractory Products at the Philadelphia Exhibition 135
The Lead and Silver Works of the Mechernich Mining Company..... 136
Mineral Production of Colorado for 1876.. 137
High Duties in Pumping Engines 137
Miners' and Assayers' Outfits..... 137
Nomenclature of Steel..... 138
On the Working of Highly Inclined Coal Seams of Great Thickness at Dombrowa, Poland..... 139
Abstracts of Lectures on Mining—No. XXX..... 139
MINING NOTES:
The Comstock Lode, etc..... 140
Notes..... 141
STATISTICS OF COAL PRODUCTION..... 141
COAL TRADE REVIEW..... 141
IRON MARKET REVIEW..... 144
METALS..... 144
FINANCIAL:
New York Stocks..... 145
Philadelphia Stocks..... 145
Copper Stocks..... 147
Gold and Silver Stocks 147
Gas Stocks..... 147
Advertisements..... 147

"THE ENGINEERING AND MINING JOURNAL" ADVOCATES THE ADOPTION OF THE METRIC SYSTEM OF WEIGHTS AND MEASURES,

and urges all who are interested in the simplification of our present complicated and unsatisfactory systems to aid, by their active sympathy and encouragement, the early introduction of this much-needed reform.

WE have received some communications relative to our remarks in the last number of the JOURNAL upon the report of the Delaware & Hudson Canal Company, and regret that the crowded state of our columns compels us to postpone their publication till next week.

THE MEETING OF THE INSTITUTE—THE METRIC SYSTEM.

The meeting, which is in session at the present writing, has been, as all its predecessors were, very instructive and agreeable.

Some fifty new members have been elected, and about thirty papers treating of a variety of professional subjects have been presented. Next week we shall give the official report of the meeting, including the names of those elected and the titles of the papers read.

Those who join with us in desiring the adoption of the metric system of weights and measures will be gratified to learn that the feeling seemed to be all but unanimous that such a change is desirable, and indeed there was no objection urged to its advantages over the nightmare of weights and measures which we now use and facetiously call "a system," that could, upon the most liberal construction, be called an argument. The most common objection seems now to be that if the Government should do anything to enforce the use of this system, to bring order out of this chaos, and to make our weights and measures conform to those of the rest of the civilized world, it would be an exhibition of tyranny too great to be endured by free-born Americans,—as though almost every ordinance of civilized society were not an act of tyranny by which men have been deprived of their natural inheritance of ignorance and barbarism. Freemen are constantly "bulldozed," to their benefit, by the intelligence of the few, and every law of government is tyranny in a greater or less degree, and most of them to a greater degree than the enforced adoption of the universal standard of weights and measures would be. The members voted *unanimously* to adopt the metric measures and weights in all papers read before the Institute, or where the old style measures are used the Secretary will insert the metric equivalent also.

The discussions that took place between the members of the two societies (Civil and Mining Engineers) must have convinced every one that the need of the change is being very generally appreciated, and that the cause of the metric system is rapidly gaining ground in this country. Its ultimate adoption is inevitable, and we feel more than ever satisfied that the day is not far distant when it will be the only system in general use. It is, however, humiliating that the American people (of course the most intelligent, etc., etc., the world ever saw, *cela va sans dire*) should have waited till the very Russians and Turks had preceded us in the march of progress and civilization, and if we do not soon convert some of the present objectors to progress, the "heathen Chinee" may yet be ahead of us. And all this after it is admitted by nine-tenths of those who know anything about the practical working of the system that it is far better than our present relic of barbarism.

DUTY-TRIALS OF PUMPING ENGINES.

Our remarks a fortnight ago, on the case of the Chicago West Side pumping-engines, have called out a communication which we print in another column. Our correspondent points us to a number of English precedents, from which he concludes that "with properly built and properly proportioned engines and boilers, a 90-million duty is a very ordinary problem to solve." We might fairly reply that our article was not intended to challenge foreign practice; and that its assertions, based on American practice, are not impugned by our correspondent. But we are quite willing to look the issue squarely in the face, and to dispute the implication of our correspondent, that American engines are not properly built and proportioned; and that, if they were as good in these respects as English engines, they could easily achieve the high duties reported from abroad.

In this inquiry, we may be permitted to assume that the properties of water and air are the same on both sides of the Atlantic. We will not even claim that there is any serious difference in the heating power of coal. It follows that the difference in results is either one of engines, or one of engineers; that is, our proportions and designs are at fault, or else our duty-trials are differently conducted. Some light is thrown on this alternative by the significant circumstance that the Cornish engine, when built in this country in all its fair (and very large) "proportions," and handled with the utmost skill, does not give anything like the high duties reported abroad. Frequent and invariable experience of this kind has justified American engineers in suspecting something radically unlike our rules in the rules which have governed foreign tests.

It is not difficult to point out several particulars of this kind. Probably the most important is the requirement in this country of duty combined with full delivery. The practice in testing Cornish engines abroad has been to strain them up to the required quantity for an hour or two, then drop back to what was called the "economical rate," and *on that* to show the "duty." But what was this economical rate? The works of WICKSTEED, POLE and others furnish an answer. From them we find that engines with 50-inch cylinders and nine feet stroke were tested for high duty when exerting *twenty-six and a-half* horse-powers; that the celebrated Fowey Consols engine (quoted by our correspondent), having an 80-inch cylinder and ten and a half feet stroke, was exerting *sixty-two* horse-powers when performing its 116.2 million duty; that Mr. WICKSTEED'S famous test of the Holmsbush engine, giving 125.5 millions, was made by burning 94 pounds of coal, and running for two hours and a-half, at *twenty-three* horse powers, an engine with 50-inch cylinder and eight feet stroke. Our correspondent is reminded that in 1861 Mr. WICKSTEED himself made a candid admission that no reliance could be placed on conclusions drawn from such tests. What do they amount to, even when prolonged to a respectable period (as they usually are not), more than the proof that if an engine has no work to do, it will do it economically? Or, to look at it in another way, if an engine of the dimensions of the Fowey Consols must, to show its economy, be run at a rate which practically *doubles its boiler-surface* for the work performed, what sort of a basis does that give for a claim of "proper construction *and proportions*" of engine and boilers? This one demand of American practice, that the engine shall do its work as well as its "duty," has put a new face on the problem, and has practically superseded the Cornish engine for water-works, by depriving it of that unapproached superiority which it was reputed to possess. It remains, perhaps, the best mining-pump; and its theoretical economy is not denied, though it has undoubtedly been overrated; but the bloom has been taken from its fame.

Another peculiar feature of many foreign duty-trials is the small number of experts employed. Mr. WICKSTEED had "a young man posted in the boiler-house," and seals put on the coal-bins; Mr. FIELD tested the Thames-Ditton engine, apparently almost alone. Compare the simplicity of these proceedings with the procession of experts and assistants who march to a duty-trial in this country; and it is not surprising that even engines of perfect English type find it impossible to produce, under such inspection, the high figures recorded abroad.

We must therefore decline to accept any of the early English tests. Mr. WICKSTEED, with his sealing wax and his young man, is not good authority on this point. Even the later tests are open to objection when it is sought to compare them with our more stringent requirements. The Thames-Ditton engines deserve special consideration as the best and biggest of their class. But our correspondent, we think, erroneously states their duty. If we are correct, the report in that case, by Mr. FIELD, gave a duty of considerably less than 90 millions. Perhaps our correspondent has accidentally taken the hundred-weight (112 lb.) instead of 100 lbs. of coal as the basis of calculation. The same may be true of some of his other citations, which we have at this moment no oppertunity to verify. We refer him to COLLUM'S *Water-Works of London*, where he will find the Thames-Ditton test, and also a report of the compound engine at Stoke-Newington, which is Thames-Ditton in every respect, except a slight difference of diameter. This engine, on a trial of *seven or eight hours only*, attained a duty of 113 millions, and "regularly performed 70 millions!" The large figure will of course be remembered when the smaller one is forgotten.

But the Lynn engine and the Lowell engine are Thames-Ditton over again, with refinements, improvements, additions and aggravations. In our opinion, the Lynn engine showed about the same duty as its English colleague, namely 87,500,000 foot-pounds—and Lowell is supposed to do the same. Let our correspondent read Mr. SKEEL'S review of the Lynn trial in our columns, and then figure to himself what would be the result if such a critic were let loose upon the records of "high-duties" across the water.

*

TECHNICAL INSTRUCTION FOR WORKMEN.

We hold it to be not only politic, but the plain duty of every government to oblige its citizens to acquire such knowledge as will make them intelligent in the discharge of their political duties and productive members of the industrial body. In other words, we are ardent believers in the education of the masses, and would not only make it obligatory that every child should learn to "read, write and cipher," as they are taught in our public schools at present, but would have placed within their reach such technical instruction as would make them skillful in their several callings. The advantages of such a policy are becoming more and more generally appreciated, and in most European countries we find special classes and technical schools for the instruction of workmen. These are largely attended by the classes for whom intended, and the trades unions have, in France and some other countries, made the absence of sufficient facilities of this kind for acquiring technical knowledge and skill a grievance, for which they hold the employing class responsible.

We are in favor of trades unions. We believe that with all their excesses, and the misery which they have so often brought upon their members by senseless strikes, they have, on the whole, bettered the future condition of the laboring classes, though too often at the sacrifice of the present. It is not safe to allow any man, or any set of men, to have unlimited power, and the great accumulations of capital on the one hand need the offset of united labor on the other, to secure to the latter its natural rights. The danger to capital comes not from the union of labor, but from the union of ignorance and prejudice which too often characterize the laboring classes, or at least control their trades unions. On the other hand, since the world is ruled by mind rather than by brute force, the workmen should seek to possess those most effective of all weapons, intelligence and education, in their disputes with capital, for as they become better educated, and understand more correctly the true relations of labor and capital, they will greatly increase their power, and will secure their rights without recourse to strikes—which are the arguments of fools—and their just proportion of the products of their labor. One of the most formidable arguments employers have against trades unions is that the men are ignorant and do not comprehend the risks and responsibilities of employers, and when they get control they are tyrannical in the last degree, and would overturn every element of industry; and they point for confirmation to the excesses and outrages which the more ignorant and violent of the workmen commit in their conflicts with their employers. Now, the surest and easiest way to bring about that harmony between employers and employed which comes from a due respect on the part of each for the rights of the other, is through education, and the most certain way to independence is through technical skill. These are the essential preliminaries to co-operative industry, where each workman will have a direct interest in the profits resulting from his own labor. The man who has education will usually become skillful, and technical skill, the effect of intelligence, will generally lead to a certain degree of literary education. We hold, therefore, that those who favor and facilitate the education, both technical and literary, of workmen, are their best friends, and they have no greater enemies or oppressors than those, be they trades unions or employers, who seek to keep them in ignorance and unskillfulness.

These views, we know, are endorsed by the wiser heads in the trades unions generally, but, unfortunately, the policy of those is often controlled by the ignorant and violent members, rather than by the wise and prudent.

These remarks are prompted by the following memorial:

Memorial of the National Board of Trade of the United States to the Honorable the Senate and House of Representatives of the State of Ohio:

Your memorialists, representative merchants and manufacturers of the United States, beg leave, respectfully, to represent unto your honorable bodies that the interference and dictation of trades unions, and similar organizations, with the system of apprenticeships, in earlier times prevailing in this and other countries, the active competition of foreign manufacturers with American industries in both home and foreign markets, and the increased attention being given by governments abroad to the development and improvement of skilled labor by instruction in science and art as applied to mechanics and manufacturers, renders it, in the opinion of this Board, of great importance to our material progress that suitable provision be made for the establishment of art and science schools in each of the several States, where workingmen and their children may receive such technical instruction as will improve and create skilled labor, to the end that the poorer classes of society may become the better fitted for a higher development of industry, and our mechanical and manufacturing interests be enabled more successfully to compete with those of other countries; therefore,

Your petitioners would respectfully pray that your honorable bodies will adopt measures for the establishment of such a school or schools as is herein indicated within the State of Ohio.

And your memorialists will ever pray, etc.

Respectfully submitted, by order and on behalf of the National Board of Trade.

CHARLES RANDOLPH, Secretary. FREDERICK FRALEY, President.

Chicago, January, 1877.

Considering this to be an admirable plan, and one promising the greatest benefits to the wage classes, one that every workman throughout the land should earnestly support and advocate, what was our surprise to find it copied into the *National Labor Tribune*, one of the labor union organs, under the title of "CONSPIRACY OF CAPITALISTS," and accompanied by such comments as the following:

These representative merchants aim to destroy the efficiency of trades unions in holding up wages by establishing schools at the expense of the State, where all who wish can learn trades and thus supply plenty journeymen for all the trades. The object of these merchants is not the good of the young men, but to bring about a reduction of wages by flooding the labor market with a plentiful supply of cheap labor, made skillful at the expense of the State. * * * *

They want to control wages and workingmen, and they seek this way to fill the country with skilled mechanics so as to fetch wages down.

In other words, they want to flood our trades with journeymen until they are compelled to work so low that we can undersell foreign manufacturers by undermining foreign skilled workmen. We say this nefarious plot deserves the execration of every American.

Must we allow our Legislatures to tax us to build schools to turn out mechanics to cut down our wages until we underwork foreign workmen? Under the cloak of giving young men good trades, the capitalists are seeking to undermine and destroy our trades unions and compel us to work for any wages they see fit to offer.

The National Board of Trade is an influential body. If the Ohio Legislature *dare* to do this, they will. We ask that the editors of our Labor publications give publicity to the above attack on our unions, and urge that they acquaint their respective organizations with the above conspiracy against Labor.

Our contemporary is like a bull with a red rag in view. When this measure, which is certainly one of the very best ever put forward in this country in the interest of the laboring classes, is proposed and advocated by a "trade union" composed largely of employers, the *Tribune* loses all control of itself, and, metaphorically, closing its eyes to the fact that the measure itself is an exceedingly beneficial one to its protegés, it denounces it in the most senseless manner. Yet similar measures have long been advocated by the workmen and leaders of workmen's associations in Europe, and the neglect or refusal to furnish such technical schools has rightly been made a sore grievance by them.

Our advice to the men is to promote by every means in their power the establishment of these few public technical schools for every trade, and let them become skilful and perfect in their callings, for in this manner can they best become independent and prepare the way for co-operative industry.

NOTE ON THE INCREASED PRODUCT OF BESSEMER WORKS.*

The revolution wrought by the introduction of the Bessemer process in the commercial relations of iron and steel is scarcely more surprising than the advance in the mechanical perfection of that process itself. Indeed, the former has been largely due to the latter; since it is the rapid development of the capabilities of the Bessemer plant which has kept the method in advance of all rivals and continually enlarged its field. In this department it is acknowledged that American Bessemer engineers lead the world. The competition between the Bessemer and the open-hearth methods, which has been waged with some approach to commercial equality abroad, has been hitherto far more difficult, and in many departments, such as the manufacture of rails, out of the question in this country, because of the greater perfection to which the Bessemer practice has been brought, reducing greatly the items of labor and interest on capital by steadily augmenting the product from a given plant. There must be a limit to this advance, and that limit must have been nearly reached, as I think the members of the Institute will agree, upon hearing the latest and highest figures of Bessemer production.

Some of these figures present a curious coincidence, involving a pleasant anecdote, which, as it may serve the additional purpose of a striking illustration, may be admissible, even in this dignified presence.

About six years ago, our fellow member and ex-President, Mr. A. L. Holley, then managing the Rensselaer Steel Works at Troy, wagered a suit of clothes with the late Hon. John A. Griswold, proprietor of the works, that the Bessemer plant (two converters) should produce in one month 1,500 tons of ingots. The next month's product was 1,686 tons—an amount at that time unprecedented—and Mr. Holley won the wager. In 1873 I remember making, with some national pride, before the British Iron and Steel Institute at Liege, the assertion that we could show them in this country Bessemer works which produced daily from two five-ton converters 100 tons of ingots. The statement was received with considerable incredulity, as a Yankee boast, probably based on an exceptional day's run. Certainly no English or European works pretended to rival such a rate of production.

But during the week ending October 14, 1876, the North Chicago works, under the management of Mr. Forsyth, have produced, out of one pair of five-ton vessels, 1,686 tons, in 316 heats. In other words, these works turned out, between Monday morning and Saturday night, the exact number of tons which Mr. Holley won his wager (and much praise besides) for making with similar plant in a whole month. Such an achievement is indeed astonishing; but it is eclipsed by the work of the same establishment a few days earlier. During the week ending September 30 there was one day when Mr. Forsyth made in 23 hours and 40 minutes the enormous number of 73 heats out of two vessels, yielding 391½ tons of ingots. As this must have kept the converters almost continuously employed, it seems scarcely likely that it will be far surpassed in future practice. There *is* a limit; we cannot make two heats at once in one vessel!

ACTION OF ACIDS ON MINERALS.

TO THE EDITOR: SIR—Observing an article in your Journal of the 17th inst. on "The Action of Organic Acids on Minerals" from Professor H. C. Bolton's very distinguished pen, makes a desire with some of us (unpractised in chemistry) to inquire in an exactly opposite direction, viz.: Has any process ever been discovered for dissolving by acid the pulverized or broken ore rock, *leaving the metal?* It has been suggested that such a process is in use in Europe, and successfully, but to a very limited extent as yet.

In your next issue the writer, a subscriber, in his own behalf and others, would be pleased to have Professor Bolton's or your own valued views on the subject. Of course you are familiar with our present processes of separation—by "stamps" for what we call the "mill ore" or lower grade, and "smelting" for the richer ores. The loss of gold and silver is estimated to be from 25 per cent. to 35 per cent by the former process, and is not known to us miners by the latter—passing as the "smelting" ore does by sale (on assay) into other hands.

Very respectfully, "COLORADO."

NEW YORK, Feb. 19, 1877.

HAY FUEL.—A correspondent in an exchange writing from Washington, Minnesota, says that a large steam flour mill of a capacity of 100 barrels per day uses hay for fuel, and adds: The hay can be put in the stack at each man's door at a cost of less than two dollars a ton, and ten tons will furnish fuel for one stove during the winter. Ingenious individuals have patented hay-burning stoves and machines for twisting the hay into knots or sticks, and so tucking in the ends that it remains firm though handled many times over. As hay is worth in the large cities from $15 to $30 per ton, our coal men need not be alarmed at this substitute.

* Read at the Philadelphia meeting of the American Institute of Mining Engineers, October, 1876, by R. W. Raymond, of New York.

THE PRICES OF IRON AND STEEL RAILS IN ENGLAND FOR 20 YEARS.

The accompanying diagram shows very clearly the great fluctuations that have occurred in the prices of rails in England during the past twenty years.

Iron rails that at the beginning of 1855 stood at £6 10s. per ton, rose in the following year to £8 5s., and from that point declined, with the exception of a few short upward spurts, to the end of 1861, when they stood at £5 per ton, the lowest point reached till the close of 1876, or 15 years later.

The average price of iron rails from 1855 to 1865 was £6 10s. per ton, and the average price for the next ten years, from 1865 to 1874, was £7 10s. The highest price reached was in 1873, when £12 per ton was paid for a few months. From that point the decline was both exceedingly rapid and uninterrupted to the close of 1876.

STEEL RAILS.—The price of steel rails, f. o. b. in the English ports, was in 1862 at its highest point, £19 per ton, and the average price during the three years ending 1864 was £18 10s. From that date to 1870, when £10 per ton was reached, the decline in price was uninterrupted; but it as suddenly rebounded from these prices, till in 1873 it reached £18 per ton, and remained there for a short time. As in iron rails, the decline in price since 1873 has been unbroken, and at the close of 1876 steel rails could be bought f. o. b. at

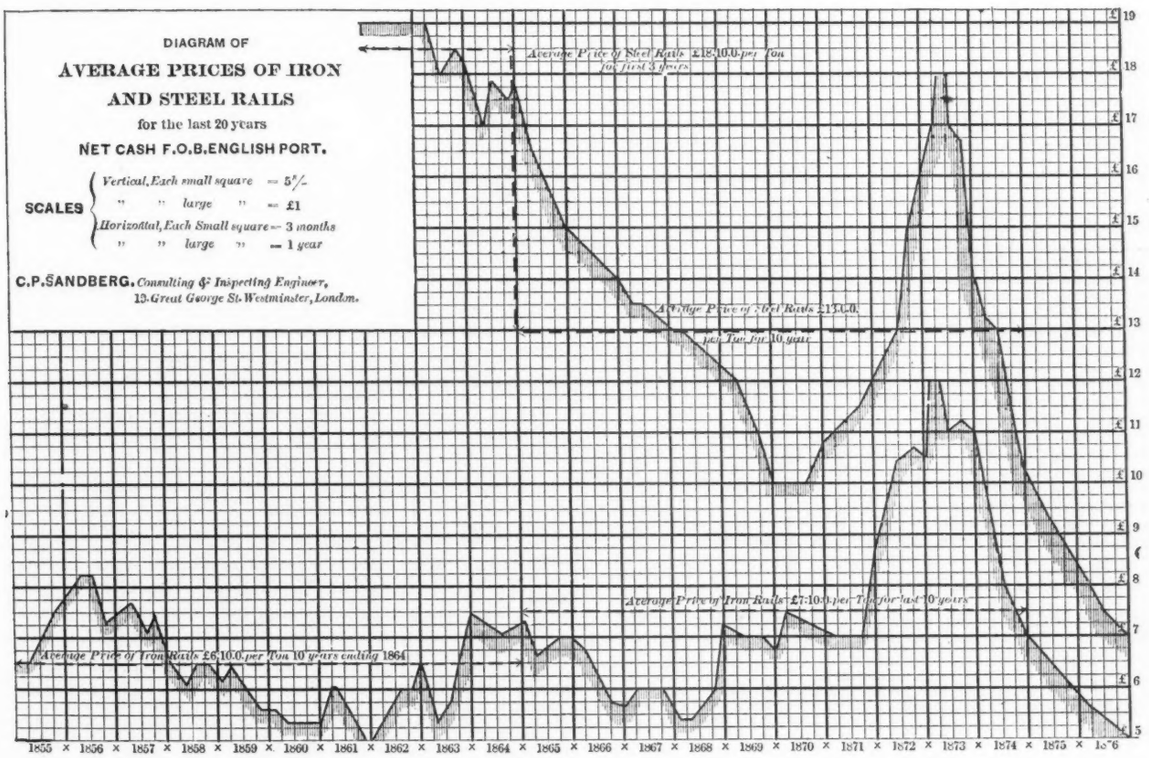


DIAGRAM OF
AVERAGE PRICES OF IRON
AND STEEL RAILS
for the last 20 years
NET CASH F.O.B. ENGLISH PORT.
SCALES
Vertical, Each small square = 5/-
" " large " = £1
Horizontal, Each Small square = 3 months
" " large " = 1 year
C.P.SANDBERG, Consulting & Inspecting Engineer,
13 Great George St. Westminster, London.
Average Price of Steel Rails £18.10.0 per Ton for first 3 years
Average Price of Steel Rails £7.17.6 per Ton for last 10 years
Average Price of Iron Rails £7.10.0 per Ton for last 10 years
Average Price of Iron Rails £6.10.0 per Ton 10 years ending 1864
£19
£18
£17
£16
£15
£14
£13
£12
£11
£10
£9
£8
£7
£6
£5
1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873 1874 1875 1876

£7 per ton, or a rate below the average price of iron rails during the ten years ending 1874. The diagrams are exceedingly suggestive and instructive, as illustrating the rapid decline which the growth of an industry has upon the price of a product. A diagram of our own steel rail market would show a similar sudden and large decline in prices, from $120 per net ton in 1873 to $50 per ton at the close of 1876. In 1862, when iron rails were £5 15s., steel rails cost about £19 per ton, or the proportion was as 1:3·30. At the close of 1876 they were only £2 per ton above iron rails, and the proportion was as 1:1·4. Those who point to the great decline in the price of steel rails as the result of protection, may find here a similar reduction in cost in free-trade England. And those, on the other hand, who think protection keeps up exorbitant rates, should study the prices of the last few years as given by this table. If like effects come from similar causes, we must look deeper than free trade or protection for the explanation of some of the features of this useful diagram.

REFRACTORY PRODUCTS AT THE PHILADELPHIA EXHIBITION.

Special Correspondence of the Engineering and Mining Journal.

The displays in this department of the exhibition, both from the United States and foreign countries, have been of a character to afford much information to one interested in the subject. The papers read and discussed at recent meetings of the Iron and Steel Institute of England, and of the American Institute of Mining Engineers, have done much to attract attention lately to the physical and chemical constitution of fire-resisting materials. Bauxite, which some time ago promised to be the best material to stand the high heats and scorifying influences of open-hearth steel melting furnaces, seems to have been outdistanced completely by silica, either in natural blocks or bound together artificially in bricks by means of a small proportion of lime and alumina. Most extraordinary progress in the manufacture of these high quality silica bricks has been made in England; so great, indeed, that one is almost led to attribute the good results obtained with them as due, in some measure, to the methods used in building them in the furnaces, and also to the care used in working the furnaces, so as to provide for the contractions and expansions which take place in the silica bricks when exposed to wide variations in temperature. In some of the English works, where it was looked upon as a remarkable run when two hundred heats were obtained from one furnace without material repairs to the roof, this number is now an average one, and in one case five hundred and sixty heats were cast from a furnace without its needing, in the interval, any important repairs. A specimen of the silica bricks used at the Landon Steel Works of South Wales, and shown in the exhibit of Siemens bows, is of a very light porous nature, nearly white in color, and showing the superficial agglutinization of its particles by the fusion of the lime and alumina with which the silica was mixed. That a similar brick has not yet been made in this country is certainly not due to any lack of raw material or difficulty in manufacture, which latter is carried on by the use of the simplest kind of machinery.

Recurring to the use of bauxite, the reasons for its failure when used in the form of bricks were due to its great contraction when heated, and also to its not possessing the same heat-resisting qualities as the silica bricks. When used in rotary furnaces in the form of powder, cemented together with about three per cent. of argillaceous clay, or with silicate of soda, and about six per cent. of plumbago being added, a lining is formed which has shown very high fire and fluxing resisting qualities.

Analysis No. I. (see below) shows the composition of the French bauxite; analysis No. II. is that of the Dinas stone, from which the silica bricks are made, and analysis No. III. is that of one of the best bricks made from a similar stone.

	I.	II.	III.
SiO_2	4·12	98·31	95·45
Al_2O_3	53·62	0·72	1·98
Fe_2O_3	42·26	0··0	0·45
CaO	....	0·22	2·06

The exhibit of refractory products compared wholly or in part of fire-clay was quite a large one, that portion representing the United States being highly creditable. The fire-resisting qualities of our best clays have so often been put in competition with those of other countries, England in particular, that it now seems proved beyond doubt that we are on a level with our foreign competitors in the quality of the fire-brick.

Until within a few years the manufacture of large bricks or "lumps," as they are called in England, has not been carried on in this country, but the displays made of this kind of product by a number of our manufacturers shows that they have seen the importance of bringing them into the market for use in blast-furnace construction. The fabrication of these large masses of clay into shapes is done wholly by hand in England and on the Continent, rendering the process an extremely expensive one. In this country, at least one manufacturer has constructed machinery for doing the same work in a cheap and expeditious manner. The demand of Bessemer steel makers for refractory material out of which to construct the tuyeres and convertor bottoms has finally led in some of our American works to the use of bottoms made entirely of fire-bricks, a thin grating only being used to bind the different pieces together. The use of these has raised the life of the bottoms from 8 and 10 blows, to 20 and 22 blows, and in maximum cases to as much as 30 blows. This improvement is only one of the many which has made possible the enormous weekly productions of all our Bessemer works.

With respect to the materials used in making the fire-bricks, there is this

difference in general between most of our manufacturers in this country and those abroad: Here the fire-clay is generally mixed with varying proportions of quartz sand and a substance (improperly called kaolin) which contains mica, quartz sand, and clay. In England, notably at Stonebridge, nothing but the carefully selected clay is used. A similar practice is now common in some of our own works when making their best quality of fire brick.

One of the most important districts from which fire-clays are obtained in this country occupies a position geologically in which there are no seams of coal. Elsewhere throughout the country and abroad, the fire-clay beds are found either in connection with carbonaceous or more recent coals. This exceptional district, that of New Jersey, furnishes large quantities of clay which rivals in quality the best obtained from the coal measures. The cretaceous formations of this State, which extend in a belt running northeast and southwest through the State from Raritan Bay, and Staten Island Sound on the east to the Delaware River on the west, and which includes about 200 square miles area, contains beds of fire and potter's clay throughout its whole extent. These fire-clays are found in beds from five to fourteen feet in thickness, and are in a plastic condition, which admits of their being easily dug, like any earth deposits. In color they are unlike the fire-clay of the carboniferous formations, being generally white, or nearly white. The largest and best beds yet found are in the neighborhood of Perth Amboy and Woodbridge, where many of the fire-brick works are located, but in addition to these there are other works in New York State and Pennsylvania which are supplied with clay from the same sources. At Trenton the beds of clay are good for making fire brick, but contain a considerable quantity of sand, which for some purposes has to be removed by washing. Analysis No. I (given below) is that of an average specimen of the Woodbridge and Amboy clay, while analysis No. II. is that of washed clay from Trenton. Analysis No. III. is put in for comparison, and is that of one of the best Stonebridge fire clays:

	I.	II.	III.
$Si O_2$	43·20	45·30	65·10
$Al_2 O_3$	39·71	37·10	22·22
Z O	1·40	1·40	0·00
K O	0·37	1·30	0·18
Fe_2O_3	0·74	1·30	0 00
$H_2 O$	14·25	13·40	9·86
Mg O	....	0·22	0·18
Je O	....	....	1 92
$P_2 O_5$	....	....	0·06
Ca O	....	0·17	0·14

It will be seen that the New Jersey clays are much higher in alumina than those from Stonebridge, and in consequence the practice of adding silicous material in making the fire brick may be a beneficial one. The so-called kaolin used to make the mixtures is found in beds which are above the deposits of the best fire clays.

A. Hall & Son of Perth Amboy displayed several specimens of their fire bricks in the Main Building. A test made some time ago by the Pennsylvania Geological Survey of the fire-resisting qualities of different kinds of brick, showed that the specimens furnished by Hall & Son outstood all the other fire-clay bricks tried. The test was made by putting the bricks on the top of a body of ignited anthracite coal in a shaft furnace driven by blast. The amount of coal used was about one bushel, and the time of trial 1¾ hours. Specimens of Scotch brick tried in the same way showed a decided inferiority. Hampton, Cutter & Sons of Woodbridge, N. J., and the New Jersey Geological Survey displayed specimens of manufactured fire-brick.

The Philadelphia makers who exhibited specimens of their products were Philip Neukumet, Kreischer & Son, and the American Kaolin Co.

TO BE CONTINUED.

THE LEAD AND SILVER WORKS OF THE MECHERNICH MINING COMPANY.

(*Continued from Page 121.*)

THE SMELTING WORKS.

These reduction works, first put in operation in 1869, were built for the purpose of working the silver lead ore from the Meinertzhagen grant, which up to that time had been sent to Stolberg, near Aix-la-Chapelle, for sale and reduction. In addition to these, ores obtained by a French company operating near Mechernich are also worked now, and also other purchased ores.

The ore sent to the furnace from the eastern part of the grant amounted to 17,489,832 kilogrammes, equivalent to 21,250 tons of 2,000 lb. each, with 60·1 per cent. lead and 186 grammes silver per tonne * of lead contained, equivalent to 2·97 oz. (troy) per ton of ore.

From the western part 3,018,032 kilogrammes, 3,652 tons of 2,000 lb., with 56·2 per cent. lead and 243 grammes silver per ton of lead, equivalent to 3·6 oz. per ton of ore. Purchased ores amounting to 2,145,590 kilogrammes, 2,595 tons of 2,000 lb., with 69 per cent. lead and 650 grammes silver per tonne lead, equivalent to 133 oz. per ton of 2,000 lb. of ore.

In general, the ores are clean galena, with little copper or antimony, and no earthy matter except quartz and clay. White lead ore is only to be found in very small quantities.

There was also smelted in 1874 931,042 kilogrammes, 1126·5 tons of 2,000 lb., old tailings from former dressing works containing 19 per cent. lead and 250 grammes silver per tonne lead, equivalent to 1·26 oz. per ton of 2,000 lb. of tailings.

The above mentioned ores, except the tailings, which, containing the lead as carbonate were smelted directly in the shaft furnace, were subjected to the roast reduction process, otherwise called the ordinary lead process.

The composition of these ores is shown by the following analyses:

	Bachrevier. per cent.	Western Field. per cent.	Tailings.
Lead	60·40	56·62	21·07
Copper	·17	·29	·21
Antimony	·07	·14	·06
Silver	·0105	·0140	·0046
Iron	·80	·80	·65
Nickel	·10	·04	not determined.
Zinc	·15	...	"
Lime	·88	·93	1·50
Silica	22·05	21·98	46·86
Sulphur	9·72	3·70	1·20
Alumina	3·60	3·84	17·03

* This is the Prussian tonne of 1,000 kilogrammes=2,427 average lb.

The roasting of the ore takes place in long double furnaces with two hearths, one above the other, having the following general dimensions:

Total length of furnace outside	49 feet.
Length of upper hearth	41½ "
Length of lower hearth	40 "
Width of hearth	11½ "
Height of arch at middle	1¾ "

There are nine working doors on each side of each hearth; the working through the upper doors being made practicable by means of platforms mounted on wheels, and movable along tracks on each side of the furnace.

In the lower hearth next to the fire-place is a depression, deepest at one side, from which the slagged or melted ore is run out. About 9 tons of ore each 24 hours is introduced into the coolest end of the upper hearth, and is slowly moved down the entire length of each hearth, till at the end of five or six days it reaches the sump or depression near the fire, where, being almost entirely freed from sulphur, and exposed to the direct action of the greatest heat, it is transformed into an easily fusible silicate of lead.

This melting is run out into moulds, cooled and broken up into pieces of fist size and larger, suitable for the shaft furnace. This latter part of the operation, *i.e.*, the melting, occupies about 6 hours and takes place every 12 hours. For each charge drawn from the furnace all the other charges are moved forward one stage and a new charge of 4 to 5 tons is introduced, so that there are continually 10 or 11 charges aggregating 45 or 50 tons of ore in the furnace at one time. The resulting roasted ore is in the form of a homogeneous glassy mass with very little sulphur, as shown by the following two analyses of roasted ore:

	No. 1. per cent.	No. 2. per cent.
Lead	54·93	62 08
Copper	·04	·14
Antimony	·12	·08
Iron	1·53	·56
Nickel	not determined.	
Zinc	....	....
Lime	1·03	1·28
Alumina	4·23	4·24
Silica	31·44	22·77
Sulphur	·70	·60

With the analysis of raw ore from the eastern part of the grant Bachrevier, may be compared the following partial analysis of the same ore roasted: Lead, 63·44 per cent.; alumina, 3·78 per cent.; silica, 23·16 per cent. It is to be remarked, however, that the raw ore lead assay is from the monthly average; while the analysis of the roasted ore is for a shorter period of time, and therefore a comparison of the two for the purpose of obtaining the loss in lead cannot be accurate.

The roasting furnaces above described, of which there are 10, require 4 men on each shift of 12 hours. The coal consumed is by yearly average 15 per cent. in weight of the roasted product.

The shaft furnaces used for smelting the roasted ore have at the tuyeres a rectangular section, with the corners rounded, and above the tuyers a cylindrical form. The dimensions are as follows:

Depth of section at tuyeres	5 feet	7 inches.
Width of section at tuyeres	4 "	8 "
Diameter of the cylindrical part	6 "	2 "
Height of feed-hole above tuyeres	12 "	
Depth of crucible below tuyeres	2 "	10 "

There are 4 tuyeres with a diameter at nozzle of 2½ inches, placed one in each side and one in each of the two back corners, a somewhat unusual arrangement.

The walls, 943 m.=3 feet 1 inch in thickness, are made of good, not too strongly burned common brick, which with this shaped furnace lasts as well as best fire-brick.

The furnace is of the kind known as crucible furnace, *i.e.*, closed in front, and in which the charge rests on a bath of lead. The bottom is made of well stamped "gestuble" or clay and sand, with more or less coke dust. The channel by which the lead is drawn off to either side is situated ·013 to ·015 meters, about 1 4-10 inches, above the bottom of the crucible, that for the slag 16 inches below the tuyeres. There has been lately tried a five-tuyere round furnace, also a three-tuyere round furnace, with diameter 5 feet 2 inches at the tuyeres and 6 feet 2 inches at the feed hole. Their work, however, did not justify a change from the old form.

The blast machines employed are "Schielder ventilators," two of which are constantly in use and two in reserve. The pressure of blast is equal to 26 centimeters of water or ¾ inch of mercury.

The mixture smelted in the shaft furnace is composed of materials in the following proportions:

Roasted ore slagged	90 parts	=39 per cent.
Furnace refuse	10 "	= 4 "
Iron puddle slag	55 "	=24 "
Calcareous iron ore (18 to 20 per cent. Fe)	10 "	= 4 "
Limestone	40 "	=17 "
Slag from same process	25 "	=11 "
Total mixture smelted	230 "	=100 "
Coke consumed	22 parts	=9·6 per cent. of total material smelted.
Parts of mixture to one of coke	10·5	
Parts of ore to one of coke	4	

Ten or twenty parts of the roasted ore are sometimes replaced by 20 or 30 lbs. of the oxidized clayey ore according to the supply of the latter. The materials to be smelted are mixed with the coke in heaps of 125 tons, and in charging this mixture is spread uniformly over the last charge.

Of eight furnaces four are generally in operation, smelting about 230 tons of material, and producing 40 to 50 tons of lead each 24 hours. The slag is assayed daily by the Belgium method, *i.e.*, with borax soda and a little argol in iron crucibles, and contains usually 3-10 to 5-10 of one per cent.; when the lead contents exceeds 7-10 per cent. the slag is re-smelted.

The quantity of matte formed is, on account of the perfect roasting, very small, amounting to 1½ or 2 per cent. only of the crude lead produced. It undergoes no special treatment, but is used as an addition in the blast-furnace treatment of the rich skimmings from the zinc desilvering kettle. The average length of the campaign with the shaft furnace is from three to four months.

Below are partial analyses of the principal fluxes used in the shaft furnace:

	Limestone.	Iron ore.	Puddle slag.
Carbonate of lime	90 per cent.	50 to 60 per cent.	....
" magnesia	5 "	2 "	....
Alumnia	2·5 "	3 "	....
Protoxide of iron	.. "	.. "	70 per cent.
Sesquioxide of iron	1 "	25 to 30 "	....
Silica	1.5 "	5 "	30 per cent.

Analysis of matte produced :

Sulphide of lead	PbS	9·24 per cent.	Ph=8 per cent.
" " copper	Cu_2S	1·95 "	
" " antimony	Sb_2S_3	·40 "	
" " iron	FeS	32·34 "	Fe=61 per cent.
Subsulphide of iron	Fe_2S	51·97 "	
Sulphide of nickel	NiS	·40 "	
Silica	SiO_2	·31 "	

Also two analyses of shaft furnace slag :

	No. 1. Per cent.	No. 2. Per cent.		No. 1. Per cent.	No. 2. Per cent.
PbS	1 (Pb=87)	1·13(Pb=·98)	Ni & Zn	not determined	
Cu_2S	·04	·06	Al_2O_3	9·71	8·14
Sb_2S	not determined	·14	CaO	21·77	20·44
FeS	4·95	2·94	MgO	1·13	1·18
FeO	20·89	32·64	SiO_2	35·05	31·27
MnO	2·23	1·24			

In No. 1 the oxygen in the acid is to the oxygen in the base as 18·7 is to 16·3. In No. 2 the oxygen in the acid is to the oxygen in the base as 16·6 is to 17·62.

These slags are therefore nearly simple silicates. Omitting from the last analysis the sulphur compounds and the magnesia and manganese, and calculating the principal compounds on the basis of 100, we have

SiO_2	33 per cent	Giving an oxygen ratio of 1 : 1.
FeO	27 "	
Al_2O_3	8 "	
CaO	21 "	

The dry assay for lead in the two samples yielded respectively 0·5 per cent. and 0·6 per cent. Each furnace in operation requires two feeders and one slag runner on each 12-hour shift. Four furnaces require 3 smelters per shift, or in all 15 men per shift for four furnaces. All men employed directly on the furnaces are paid by the day, while the masons, those employed in mixing and heaping the ore and removing the broken slag to the waste dumps, work by contract.

TO BE CONTINUED.

MINERAL PRODUCTION OF COLORADO FOR 1876.

STATEMENT OF MINING AND MILLING OPERATIONS.

The mines of Colorado have made a far better showing in 1876 than in any former year. This State, as in 1875, ranks next after Nevada and California in the export of the precious metals. The increase is mainly in gold, the low price of silver for a portion of the year, and other causes, affecting some of the argentiferous districts badly. There is every prospect of a yield of $9,000,000 for the year 1877, of which nearly two-thirds will come from the silver regions.

The bullion yield for 1876 was divided as follows, as nearly as can be ascertained :

Silver	$3,696,885 58	Lead	$80,000 00
Gold	3,00,000 00	Total	$6,876,885 58
Copper	100,000 00		

The product of 1875 was $3,532,373 in silver, $2,627,444 in gold, $90,000 in copper, and $50,000 in lead.

The coin value of the yield of 1873 was $4,070,000 ; of 1874, $5,362,000 ; of 1875, $5,43c,876.68 ; and of 1876, $6,191,907.82.

Compared by counties the returns are as follows (coin value for 1875, coin and currency values for 1876 ; gold is reckoned at $1.11½, which was about its average value for last year):

Name of County.	1875. Coin Value.	1876. Coin Value.	1876. Currency Value.
Gilpin	$1,520,677 13	$2,105,544 78	$2,342,890 73
Clear Creek	1,783,054 31	1,982,548 28	2,110,541 35
Park	716,258 62	557,044 84	613,300 00
Boulder	661,206 89	547,085 20	610,000 00
Summit	122,413 78	350,000 00	390,250 00
Fremont	294,827 58	251,121 06	280,000 00
Lake	104,258 62	90,900 00	101,353 50
The San Juan Country	90,517 24	244,663 66	272,800 00
Other sections	140,662 51	50,000 00	55,750 00
Total	$5,430,876 68	$6,191,907 82	$6,876,885 58

The largest gains are shown in Gilpin and Summit counties, and in the San Juan country. The temporary suspension of work on some prominent veins caused the falling off in Boulder, Fremont, and Park counties, and poorer qualities of ore in certain mines affected the yield of the latter.

There were ten lodes or mines in Colorado whose production in 1876 exceeded $100,000, and nine in the preceding year. Below will be found the yield of most of the prominent mines for two years, and the present depth of deepest shafts :

SHAFTS.	Depth.	Yield of 1875.	Yield of 1876.
Gilpin County :			
Bobtail	700	$247,700 00	$335,100 00
Gregory	830	260,944 65	247,982 33
Gunnell	700	152,729 56	231,722 06
Kansas	730	100,000 00	125,000 00
Clear Creek County :			
Pelican (est.)	500	400,000 00	400,000 00
Dives (est.)	500		
Stevens	400	.....	83,805 00
Boulder County :			
American	230	.....	80,000 00
Melvina	220	.....	75,000 00
Cariboo	580	204,710 00	20,000 00
Summit County:			
Tunnel Mines, Boston Silver Company	....	.....	220,000 00
Park County :			
Moose *	300	200,000 00	195,000 00
Dolly Varden	....	.....	66,000 00
Russia	....	.....	40,000 00
Fremont County :			
Pocahontas	350	200,000 00	140,000 00
Rio Grande County :			
Little Annie	....	.....	100,000 00

* The Moose produced $50,000 worth of ore additional, which had not been smelted.

The mines credited to Gilpin and Rio Grande counties are gold-bearing, and those of other sections silver-bearing, excepting the telluride veins, American and Melvina of Boulder, which carry gold and silver. There were many lodes in Gilpin, Clear Creek and Boulder counties which produced somewhere between $20,000 and $70,000 last year. Of this description are the Buell, Ute, Fisk, Furnald, St. Louis, Kent County, and others in Gilpin ; the Hukill, Colorado Central, Pay Rock, Marshall Tunnel lodes, Young America, Polar Star, Baxter, Phœnix, Coldstream, Magnet, Chelsea Beach and others in Clear Creek, and the No Name, Smuggler, Grand View, etc., in Boulder.

GILPIN COUNTY

gives the following proportions of gold, silver, copper and lead :

	Coin Value.	Currency Value.
Gold	$1,878,818 34	$2,090,390 73
Silver	151,569 50	169,000 00
Copper	70,672 64	78,500 00
Lead	4,484 30	5,000 00
Total	$2,105,544 78	$2,342,890 73

The total number of tons of ore mined and treated was 142,692. The cost of mining, hoisting and milling on the Gregory and Bobtail mines is about $5, but improvements and expenses of sinking the great shafts, etc., bring current expenses up to such figures that but little profit was possible. This may not be the case another year. Other mines show a cost of from $5 to $10 per ton. Smelting works buy ore on a margin of from $35 to $50 per ton. The concentrating works pay prices often quite profitable to the miner on ore that cannot be handled satisfactorily in quartz mills.

PARK COUNTY

shows a decrease from the yield of 1875, whose currency value was $830,860. That of 1876 was as follows :

	Coin Value.	Currency Value.
Silver	$445,941 92	$495,000 00
Gold	93,963 96	104,300 00
Copper	12,616 63	14,000 00
Total	$552,522 51	$613,300 00

The same was derived from the following sources :

Boston and Colorado smelting works	$371,000
Mt. Lincoln smelting works	115,000
Hall Valley " "	20,000
Horseshoe works	5,000
Silver ore bought and sent to St. Louis.	40,000
Gold—placer, with small amount of stamp-mill gold	62,300
Total	$613,300

The product ($511,000) of the first three works was sent in the form of matte to Black Hawk for parting and refining. The capacity of the four works is about 50 tons daily. Some advance is being made in placer mines. Over 200 Chinamen are employed in the Fairplay placers.

TO BE CONTINUED.

HIGH DUTIES IN PUMPING ENGINES.

TO THE EDITOR : SIR—In your article on the Chicago pumping-engines the question is asked, "Where, after full preparation with clean fires and selected fuel, has this duty (90,000,000 lbs. per 100 lbs.) been achieved ?" Presuming that the "where" includes all the world, I note the following recorded experiments : Mr. Wicksteed, in his work on the "Cornish Engine," 1841, says—"16 experiments of 12 hours each with East London Waterworks Cornish engine, single cylinder, single acting, expanding, gave from 67·7 millions to 126 millions, average 92 millions per 100 lbs. Another experiment of 118 hours duration gave 96·6 millions. Another experiment of 24½ hours duration with the Fowey Consols mine engine gave 116·2 millions. Taylor's mine engine, from July 1 to August 4, 1841, gave 108 millions. The double cylinder rotary engines at Thames-Ditton Waterworks in 1857, on a 24-hours trial, gave 92·76 millions. The single cylinder rotary engine at New River Waterworks, regular working, gave 85 millions, and when coupled over 90 millions. The single cylinder rotary engine at South Staffordshire Waterworks gave 100 millions on a 10-hours trial."

I am not discussing the question as to whether, with such restrictions as to boilers, a 90-million duty is possible, but merely showing that with properly built and properly proportioned engines and boilers a 90-million duty is a very ordinary problem to solve.

G. K. R.

NEW YORK, February 19, 1877.

MINERS AND ASSAYERS OUTFITS.

There is nothing more provoking than to find after the expenditure of much precious time and money in making analyses, that the results of our labors are worthless, owing to the impurities of the chemicals used or the imperfections of the apparatus employed. We confer a favor, therefore, on such of our readers as require assayers' chemicals or implements when we direct them to Mr. E. Benjamin, whose address will be found in our advertising columns. Mr. Benjamin inports and manufactures only the best quality in each class, and his great experience and high standing afford the necessary guarantee that those who buy of him will not be disappointed.

Among the articles which he supplies and which are being more and more generally used are spectroscopes; indeed few chemists or doctors who desire to be considered at all *au courant* in their profession, can afford to be ignorant of the spectrum analysis. A new and very interesting instrument which Mr. Benjamin offers for sale is the radiometer, the theory of which has attracted much attention of late. While it was at first asserted that by its means the weight of a ray of light could be determined, the further investigation of the subject seems to prove that the movement of the radiometer is effected by the reaction of reflected rays on the surrounding atmosphere, for it will not move in a perfect vacuum, yet it is most sensitive in a highly attenuated medium. The practical applications of the radiometer are not yet developed, but it is an exceedingly interesting instrument, and no doubt the experiments being made with it will lead to important practical results.

Mr. Benjamin has many other interesting and useful instruments in his large establishment, and the well known excellence of what he keeps makes it unnecessary for us to recommend those who have occasion to use miners or assayers outfits of any kind to patronize him.

NOMENCLATURE OF STEEL.*

By M. A. Greiner, Chief Engineer of the Steel Works of the Societe John Cockerill at Seraing.

In a former paper, 1870, I urged that the word *steel should be applied to all malleable products obtained by fusion from iron ores.* It is by a melting process that steel is produced, the most marked result of this process being a *great homogeneity* of structure which secures in the product a freedom from welds. These first impressions have been deepened by daily experience, and in a note read the 26th of December, 1872, I urged for steel a nomenclature more in harmony with the actual state of this important manufacture ; and giving a new form to my idea, I proposed to apply the word *steel to all malleable products of the iron trade which are obtained by fusion.*

I should fear, in reverting to this subject, to abuse your attention, but I have to defend myself against some criticisms of an eminent French metallurgist. Fortunately, I am not alone in this conflict against an adversary of such high authority. Beyond Mr. Jordan (the well-known professor of metallurgy at the *Ecole des Arts et Manufactures* at Paris), who has adopted the same views that I have on this subject, several other engineers have explained the question with new and various views, and the cause which Mr. Jordan and myself first defended has found more advocates than opponents.

Several important points may be noted for consideration, viz. : The imperfect knowledge of the nature and properties of steel lead every day to unfortunate results in its use. It is important to determine the properties of steel and its exact nature, because thus only is it possible to prevent the metal from being employed in cases where it ought not to be. I think it is very important also to fix clearly the ideas of students on the subject, to avoid the confusion which so largely prevails in all metallurgical books, so as to give them definite and correct ideas about steel. Another practical point of the nomenclature is that concerning the duty. Everybody connected with the steel trade knows how irregular are the duty rates, and desires more clearness and simplicity. I think our nomenclature, if adopted, would give this result.

M. Grüner has criticised our nomenclature in his report on the Vienna Exhibition. I have before said that he finds a competitor in France in Mr. Jordan. In England Mr. Hackney has recently published a note read before the Institution of Civil Engineers at the Swansea meeting, and comes to the same conclusion that we do. In Italy Colonel Rosset, in his excellent book on large guns, accepts the new nomenclature and explains why he abandons the old ones. In Russia the Association of Civil Engineers gives, in the person of Mr. Tchernoff (the able Director of the large Oboukhoff Steel Works), sanction to our views, and in America numerous notes of Mr. Holley show that this eminent metallurgist has the same opinions. It may be seen by this that not only metallurgists, but practical engineers and artillerists agree in those new views.

1. Thus, when M. Grüner says : "If it is so, all that has been called steel till now, *in all time and in all countries*, would only be iron !"

Mr. Holley wrote to me, March, 1875 : "Steel is a compound of iron which is cast while in a fluid state into a malleable mass. A popular criterion is the dictum of the smithy : 'Whatever will harden by being plunged into water at a red heat is steel ; whatever will not thus harden is wrought iron.' Now, since the old nomenclature of the smithy was founded on and confined exclusively to high tool steel and wrought iron, it cannot possibly cover the whole group of soft steels, which are of recent creation. If old nomenclature is to be held as a criterion, then the modern condensing steam-engine should be a 'low pressure' engine. The fact is, on the contrary, that it is often a 'high pressure' as any non-condensing engine. *The determination of previously unknown intermediate forms and functions is constantly changing all systems of classification*, hence the criterion of all classification is inadequate and worthless."

This sufficiently refutes the first objection made by M. Grüner.

2d. M. Grüner says afterwards: "Thus, puddled and cement steel would no more be steel, notwithstanding their special properties, which distinguish them from iron !" We know these properties, and will again revert to them. In our own country, smiths call these metals *temper iron* (fer de trempe), as if to distinguish it from other metals which temper, but are obtained by fusion.

3d. "What !" says M. Grüner, "it would be astonishing that a simple physical operation, the fusion, should have on the name and the properties of the metal a greater influence than the chemical composition has !" I regret that this is a fact, and think, with Mr. Holley, that "the only classification that can cover the majority of cases is based on the molecular arrangement of the metal rather than on its atomic character—on its *mechanical structure*, and not on its chemical ingredients, nor on those physical properties that first became apparent."

Mr. Jordan, in his book on steel in America, decides also in favor of the *structure:* "A nomenclature based on chemistry can only end in errors. If steel would be named a mixture of iron containing carbon enough to harden when put red hot into cold water, then puddled iron, notwithstanding its *lamellated* and *heterogeneous* structure, would be steel ; whilst the finest crucible product, notwithstanding its *crystalline* and *homogeneous* structure, would not be steel. The principal and chief difference between iron and steel is *structure*, easy to recognize, whilst analytical chemistry gives no result ; the same proportions of carbon, manganese, silicon and other ingredients being often the same in both steel and iron."

This is very clear, and in conformity with the conclusion of my paper of 1872. I said : "Two parallel series of products are now produced in the iron trade, having the same chemical composition, and differing only in the means by which they have been obtained—that is, in their *structure.*"

4th. M. Grüner gives an example of a piece of soft iron remelted at La Berardiere, and says that the "only change produced is a greater *homogeneity* and *purity.*" In my notes of 1870 and 1872 it was remarked that "*homogeneity* and *compactness*, being the results derived from a fluid state, are qualities distinguishing *steel.* Indeed, everybody knows that iron blooms are formed from iron grains pasted together, in a more or less fluid mass at a temperature relatively low. By hammering and rolling this metallic sponge, a great deal of the lag is separated, and the metallic grains are compacted enough to weld. Thus is obtained a piece of rough iron *(fer ébauché)*, a primitive form of iron, very different from that of rough steel. This steel, produced at a far higher temperature, is formed by iron drops more or less carburized, completely free from slag, and it gives, after cooling, an ingot or homogeneous and solid *lump*, or as Mr. Holley says, "a crystalline mass run together by gravity while in a fluid state.'

In fact, it is the question of temperature which largely determines the characteristic qualities of both iron and steel ; no other means being so efficient in rendering a metallic mass homogeneous, and in ejecting the slags so as to make it compact.

5th. Since then M. Grüner values so justly the homogenity of molten metals, as may be seen from the preceding paragraph, he proposes to call them *homogeneous irons*, "a word," says he, "already adopted in England for those molten irons which do not harden." We can urge, however, that many English manufacturers have already designated puddled *steel* by the name of steel-iron *(fer acierieux)*, and this argument is not serious, as England is a country well known for its wide diversity of opinion on technical terms. *Homogeneous iron* is a word more useful in commercial than technical transactions. Some ignorant buyer, who would not take a steel with 0·10 per cent. of carbon. would pay for homogeneous iron (because it is not steel) double the price. The new word is a label, as "Staffordshire" iron, "Low-Moor" plates, or "Swedish" pig, and many other brands well known to purchasers.

6th. Where can the limit be drawn between homogeneous iron and steel ? M. Grüner says it is the tempering, but if it is so, steel works manufacture much more homogeneous iron than steel. M. Grüner himself cannot avoid the confusion, as will be shown hereafter.

He says that the whole production of iron of the world was, in 1873:

Pig iron	13,800,000 tons.
Soft iron, not molten	8,500,000 "
Steel and homogeneous iron	1,064,000 "

It is quite impossible, in fact, to separate steel and homogeneous iron.

Further he adds : "This shows that if England produces half of all pig iron and steel (here he does not complete the word by adding homogeneous iron), the production of soft-welded iron is only 41 per cent. of the total amount."

In each case when M. Grüner would speak of iron, he must specify soft-welded, or soft, not molten. We have no expectation that this nomenclature will be adopted,

7th. In conclusion, M. Grüner does not hold that fusion may be a cause of the great difference between iron and steel, as we now know these metals.

"I term steel," says he, "whether molten or not, any kind of iron which will *harden by tempering*, but malleable when hot or cold, if it has not been cooled rapidly. I call *soft iron*, whether molten or not, any kind of iron which will not harden by tempering, and is malleable when hot or cold."

Mr. Holley objects with reason : "If hardening in water is the characteristic of steel, who is to define hardening? As a matter of fact, all products of the crucible, open-hearth, Bessemer vessel and puddling furnace containing 0·25 per cent. or more of carbon, will perfectly harden in water just in proportion to the carbon contained. If the product will make a tool, it is 'steel,' says the smith. What kind of a tool? Is an agricultural tool iron, and a cold chisel steel, or does steel begin between cold chisels and razors? If so, where? A water-hardened tool, perfectly adapted to certain uses, may be made of Bessemer metal containing half per cent. of carbon ; the same ingot may make a good rail. If one part of the ingot is steel, why is the other part iron? The line between steel and iron must be sharply defined. Does it lie between 0·75 and 0·76 per cent. of carbon, or 0·99 and 1 per cent.? Obviously, no two men will, or can, agree on the amount of hardening, or of carbon which constitutes steel, so that the whole range of structural steels, forming at least three-quarters of all the steels produced, could not be included in any classification"

I think that less than 10 per cent. of the steels produced do not harden, and what will become of the newly-discovered phosphorus-molten-malleable products? Are they steel or iron? They don't harden.

8th. Let us see to what conclusions the proposed nomenclature will lead. It will be seen as follows :

Non-hardening.—Soft welded iron, homogeneous iron, grey cast-iron.

Hardening.—Hard welded iron, steel, white cast-iron.

This is a nomenclature troublesome as well for metallurgical books as for duty rates. We class simply all iron products as : Iron, steel, cast iron.

These generas are divided into species in farther distinguishing between the various grades of either steel or wrought iron by means of physical and chemical tests. Colonel Rosset gives the following definition :

Iron is the malleable, not molten, metal.
Steel is the malleable molten metal.
Cast-iron is the not malleable but molten metal.

RECAPITULATION.

In our opinion, tempering, this characteristic of old nomenclatures, has no value to-day ; it is the *structure* which distinguishes iron from steel. By structure is not meant the grain or fibre of the metal, but *homogeneity* and *compactness*, the first result of which is more ultimate resistance and higher elongation, as proved by testing machines. Thus, while superior iron shows an ultimate resistance of 25 tons per square inch, with 18 to 22 per cent. elongation, we see cast steel, of the same chemical composition, showing an ultimate resistance of 30 tons per square inch with 25 to 27 per cent. elongation, the metal being evidently more homogeneous and compact, that is, more dense.

In practice, whenever a manufacturer is forced by severe tests, and has also the liberty of choosing his metal, he will always give the preference to soft steel. This has been the case with plates delivered to all shipyards, especially to the French national shipyards.

We urge that the testing machine is the best and probably the only means of determining, under their different forms, both iron and steel, and there is also need of an understanding between all works, so that the tests shall be capable of comparison with each other. We find that 75 millimetres in diameter, by 100 millimetres in length, is a convenient size for the simpler test pieces in steel works. These sizes have been employed in our works for all the tests we have made.

A second condition of homogeneity and compactness of steel is absence of slags, veins and flaws. What makes the growing preference for steel rails? Is it not the absence of welding seams rather than hardness, for theoretically a rail with a phosphorus iron head is more durable than a steel rail, which is often soft but homogeneous? No practical man, however, would prefer the former, because experience has proved that iron rails fail more on account of bad welding, than from too great softness of the metal.

The same fact has occurred with the well-known *weldless iron tyres*, the failure being generally in a bad weld of the metal.

If most of the axles, pins, slides, piston-rods, beams, cannon hoops, and all important parts of mechanical engineering are now made of steel, is it not because these pieces, taken from a compact ingot, are surer to resist continual vibrations which gradually destroy and break iron? And when a regular soft quality of steel can be obtained, and the boiler maker will follow the guidance of experience in the employment of these qualities, no doubt steel plates will be largely employed instead of iron plates. The French marine has given a striking example of this within a few years.

I will conclude by giving the following scales of iron and steel, supposing carbon to be the only ingredient which distinguish the species in both :

* Paper read at the meeting of the Association of Engineers from the School of Mines at Liege, May, 1875.

IRONS.			
Fibrous Iron.	Granular Iron.	Steel iron or puddled steel.	Cemented iron or steel Variety: Milano steel.
STEELS.			
Extra soft steel.	Soft steel.	Hard steel.	Extra hard steel.
CONTAINING CARBON.			
0 to 0.15	0·15 to 0·35	0·35 to 0·55	0·55 to 1·00

These parallel series have been adopted by Mr. Hackney in his excellent and extended paper on the Manufacture of Steel Rails, read to the Institution of Civil Engineers the 6th of April, 1875. These series must only be considered as a matter of parallelism, but in practice this classification is sufficient, as Mr. Hackney says "engineers and manufacturers pay a deserved respect to scientific men, to those who take up the study of technical processes from their scientific aspect; but after all, it is by the practical workers that the meaning of technical terms are fixed, and on this question practical men are daily speaking unmistakably."

A. GREINER.

SERAING, April 30, 1875.

ON THE WORKING OF HIGHLY INCLINED COAL SEAMS OF GREAT THICKNESS AT DOMBROWA, IN POLAND.

In the Abstracts of Papers in the Foreign Transactions and Periodicals, compiled for the use of the Institution of Civil Engineers, and edited by James Forrest, Esq., we find the following abstract of a paper by Mr. Joukowsky which appeared in the *Bulletin de la Société de l' Industrie Minéralé:*

The coal seams of Dombrowa, forming an extention of those of the Upper Silesian basin at Zabrze, Myslowitz, etc., are of great thickness, and dip at a considerable angle. The coal is dry, unfit for coking purposes, and very inflammable; conditions which render the working difficult, as special methods are required in order to get as much large coal as possible, the slack being comparatively valueless, and liable to give rise to spontaneous combustion. The calorific power, however, being high, the ash small (not exceeding 4 per cent.), and sulphur almost completely absent, the coal is in considerable demand for metallurgical works, locomotives, and domestic consumption. The average price during the last four years has been about 10s. per ton for large coal, but only about 1s. for rough slack.

The method to be described has been adopted at Nowo Labensky and Chieshkowsky, where the seam is from 52 feet to 59 feet thick and varies in inclination from 15 deg. to 40 deg. At these places it was originally worked in open-cast, but the rapid increase in the amount of cover to be stripped, owing to the sharp dip, has rendered the continuance of this plan impossible.

In laying out the underground workings, the French method of taking the coal in horizontal slices and packing the openings with earth from the surface (*remblais*) was found to be objectionable, both on account of the cost of timber and packing material, and the crushing of the coal by the irregular shrinking of the filling material, which produced such a large proportion of slack that the mine could not be worked at a profit. It was decided, therefore, to adopt a modified syst m, in which the coal is taken in slices from above downwards, but without packing, and this has been carried out in the following manner:

The seam, which dips towards the pit, is laid open by a pair of cross-cut levels about 33 feet apart vertically; when these levels reach the coal they are continued right and left on its course, keeping close to the line of intersection with the roof, and preserving their relative positions. The upper one of these is used as a main drawing road, while the other serves as a drainage and return air-way. At intervals, varying froom 260 feet to 360 feet, rise headings are driven in pairs parallel to each other, about 23 feet or 26 feet apart, but of unequal section, the larger one being intended for conversion into self-acting inclined planes, while the smaller, designed primarily for ventilating purposes, is used by the miners as safer for travelling than the main inclines. In driving these headings a thickness of about 3 feet of coal is left on the roof side, below the actual roof, which is a black, carbonaceous shale, often very combustible, and even liable to spontaneous ignition.

From the top of the rise heading a gallery is driven right and left on the roof side, parallel to those below, and the coal is divided for working by headings, which are driven across to the floor of the seam at regular intervals, leaving pillars 40 feet to 43 feet thick between them. These headings are from 8 feet to 10 feet in height, the coal being worked in stages about 13 feet thick, so that a thickness of solid coal of at least 3 feet is left as a temporary roof to support the waste of the upper stage previously worked out. The stripping of the pillars is commenced in the centre of the panel formed between any two of the inclined planes, after removing the roof coal, by cutting back the pillars in a direction parallel to the cross headings for a breadth and length of 20 feet, and a height of 13 feet, timber props being used to protect the working faces. When the whole of the coal is removed, a layer of small wood and props is placed on the floor, forming a kind of cushion, which distributes the pressure of the fallen rock and waste over the surface of the next lower stage in such a manner that the roof, although consisting merely of broken stuff, is sufficiently coherent to be kept up by the use of timber props. When the pillar has been entirely removed, the roof is allowed to come down by withdrawing the props, wherever it is possible to do so, but those that are too tightly held are shattered by small charges of dynamite. Usually three stages may be worked at a time; while the pillars are being removed in the uppermost, the headings are driven in the one below, and the longitudinal galleries are being driven in the third.

The coal being always supported upon a firm bed is not liable to crushing, and thus one of the principal causes of spontaneous ignition is avoided. In the event of fire, however, there would be but little difficulty of mastering it, as the pillars are only 40 feet broad, and may be approached from three sides. In order, however, to obtain the full benefit of the method, it is necessary to pack the excavations formed by the first four of five stages at the top, so as to have a protecting cushion for the workings against falls of rock from the sides of the old excavations.

The proportion of round coal obtained by this method is 65 per cent. of the total quantity raised. The total cost of getting is 6s. 4d. per ton, while the average selling price, taking round and slack together, in the proportion of 6½ tons of the former to 3½ tons of the latter, is 7s. 4d., leaving a profit of 1s. per ton. If the method of packing had been employed there would have been a loss of about the same or rather more from the larger proportion of slack produced.

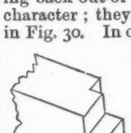
ABSTRACTS OF LECTURES ON MINING.—No. XXX.

By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(*From the London "Mining Journal."*)

As to the method of securing shafts, timber is that which is generally adopted in the first instance. If a shaft is only to serve a temporary purpose, then, of course, nothing more than timber will be used; on the other hand, it may be that when timber is used in the first instance it is with the intention that as soon as we have reached a firm foundation some other means of securing the shaft will be adopted. If the ground be of a bad or running character it may be impossible to use any of the methods to be described in the present lecture. In small shafts, where the area exposed to pressure is not considerable, very slight frames may be often sufficient to keep open the shaft, with the assistance, it may be, of planks or laths behind. In some cases what is called casing is carried out—by the application of thick planks specially cut for the purpose; and of this you cannot see better examples than are presented in military mining. It is usually effected by placing a frame of timber at the surface, to which the subordinate frames are suspended by ropes, chains, iron bars, or strips of wood. Thus, if we take a shaft about 4 feet 6 inches square we shall have a frame of pieces of timber intersecting one another, held by notches where they cross, and with the ends projecting to a distance of 12 or 13 inches, or more, and this frame may conveniently be held in its place by pickets. This will form the upper or day frame, having a hold on the surface of the ground. Then we should be able to dig down a small distance, commonly about 3 feet, before it became necessary to put in a second frame. This second frame would be of much the same character as the first, only without the projecting ends, and would be stripped on to the first by means of wooden strips, or laths. Usually it is desirable that laths should be put down at the four sides of the frame; these will be driven outwards at an angle, the pressure of the ground gradually forcing them up to the frame. It is usual in these shafts to retain a little extra height for the purpose of giving a little tipping piece, so the laths will be left up above the day frame, and another frame above that may be required. In cases of opening shafts of considerable section, the pressure from the sides will be almost immediately sufficient to keep the successive frames in order, so that in this kind of work very little attention is paid to the stringing of the frames together. Another variety used in military mining, and repeated also in the small shafts of the hematite districts and of the Australian gold diggings, has a kind of lagging, to represent the casing, which is carried out with thick planks, 2 to 2½ inches.

For the method of casing, stout planks 10 to 11 inches wide are taken; these are slightly winged, or a small piece is taken out of the side of one and checked to the thickness of the other, so that they fit together. In this way a frame is made up, and these frames may be placed at distances equal to the breadth of the planks in ordinary ground, in bad ground closer together, while in running sand they have to be placed quite close to one another. In some of the Scotch coal districts pits 14 to 20 feet long are protected in a somewhat similar manner, by means of barring, where planks of about 4 inches thick are made up into frames, but are checked only to a small depth, usually only ½ inch, just so as to make a joint, and then the angles strengthened by means of corner pieces. The most usual methods found necessary in metal mining have adhered more or less closely to this character—frames placed at distances asunder according to the nature of the ground, and kept apart vertically, partly by the pressure of the ground, in other cases by small props, or studdles, placed between the frames. A plan used in the North of England, one which the lecturer did not think was altogether well to be adopted, consisted in having two longitudinal pieces of timber kept asunder by means of struts, one end of the strut being cut to a point, which was received in a mortice in the timber. If for no other reason, the plan was objectionable for this, that it impaired the strength of the timber. The other end of the strut is driven in between the pieces, and so wedged. With this method of timbering accidents have taken place from time to time in the district of Whitehaven, since if the ground be worked away below to a considerable extent, or if anything can fall away from behind the frame so as to leave large open spaces, there is a considerable risk of the whole dropping away from one joint. This can be prevented to a great extent by the simple plan of putting in the corner pieces of different lengths, so that the joints may not occur together. The more usual method is to have the frames pierced together by taking off half the thickness, whether with round or square timber. In the ordinary timbering of mines it becomes an important matter to see that the timber is efficiently supported, even when carried down only to a few feet. On getting down to the ground which you consider sufficiently secure, transverse beams will be put in as bearers; sometimes being inserted into the ground on both sides of the shaft. Usually, when the sides are horizontal or vertical, the timber is brought down into its place by means of a notch; in other cases, especially in inclined shafts, a hitch will be cut at one end only, and the other end brought down in the manner of the stull pieces. Then most frequently a frame of four timbers will be placed on the bearers, and at the corners over the joint studdles, or struts, will be put in; and if the shaft be of extra length another pair of studdles may be placed in the middle. These struts will usually be from 10 to 12 feet long, then another frame will be laid on these, and thus timbering of a more permanent character will be obtained. The first timber will be removed upwards, and then planks will be driven in around the new frames, and any small spaces be filled up with wood or stone, so as to prevent any possibility of the framework falling back out of position. The joints used in Cornwall are of a very excellent character; they give more trouble in cutting, but are very firm. One is shown in Fig. 30. In our own country the timbering of the circular shafts of the collieries is of much the same character as that described above.



If the ground is of broken stone or gravel the struts may have to be very short, and in fact where you have watery ground, or very loose sand, it will be necessary to put down one frame close on the other, and then the timbering comes to look very much like the lagging used in Scotch mines, but it is of a much stouter character. Some of the most remarkable timbering of late years is that introduced in the Comstock district, where the shafts in some instances have been attempted to be carried through the body of the lode, and maintained there in the midst of a mass of loose material, and where no expense has been spared in some cases to introduce timber of great size and strength, rendered necessary by the great dimensions of the shafts. The plan of one of these shafts is very instructive in this point of view. Take a shaft of 24 feet long, fitted with timber 8 to 14 inches square, having 3-inch planks driven behind the frames all round the sides, forming what we call lagging. The length of the shaft is divided up into convenient

compartments by means of props, which are of very great importance in preventing the sides from collapsing under the great lateral pressure. These props are generally placed in steps, two props to each principal frame; they are very important also for the attachment of the guides for drawing. This has generally been carried out with round timber, in some mines 14 inch square timber has been used. In certain mines this timbering has collapsed, and it has been necessary after a very short time to take it out, and replace the sets in close proximity to one another.

Where the sand is very loose, or the strata very watery, methods have to be adopted which come very near to those of tubbing, a subject we shall have to consider in a subsequent lecture. In general they will consist of putting down the latter more carefully than usual, and in filling up the space behind the laths with brushwood. In the Bolgen or wall-post method, used on the Continental, longitudinal pieces or wall plates are put in, and kept open by transverse pieces, and in addition by a strong frame at each extremity, the length of this timbering being from 1 to 2½ fms. The whole structure consists of a pair of very strong bearers, generally placed in a hitch in the ground at one end, and the other either abutted against the firm rock, or against a head piece if needed. In each angle is placed a strong piece as an upright, and these are kept asunder by struts for the time being, till the whole framing is complete. Above the bearer will be placed a quantity of round timber, or if frames are resorted to it may be a series of successive frames, or sets with struts between them, much in the same manner as in the former arrangements. For keeping all these in place the corner pieces, or principals, are strutted, another set of bearers are put in above, and the two, wedged by transverse struts, made to fit over the round timber, and well driven in on it. Inclined struts are preferred to those set at right angles, since a small settlement of the ground does not throw them out of place. This method is used in spite of the great quantity of timber needed, where the ground is very heavy, as in the Hartz. Generally speaking, with regard to the timbering of shafts, the prime cost of the timber, and then the maintenance, is so important that in different districts a great many devices have been followed in the attempt to economise. The cost of cutting and suitably fixing is very great in the first instance; then there is the effect of the atmosphere, so that one finds in certain mines, and in certain parts of mines, the timber is rapidly affected by dry rot. This dry rot will generally be found associated with a heavy atmosphere and a great degree of warmth. It cannot always be detected on the surface, but the timber requires to be scooped, or tested by the hammer, hence it is very important that this test should be occasionally employed. When decomposition of mineral substances is going on very rapidly in the mines the timber should be protected by better ventilation than usual. Where you have a fresh atmosphere, and water trickling down, the timber may last for a long time. In some mines in the Harz they have pipes laid down the shafts carrying water, with small holes, or with rose jets, so that a small stream of water trickles down the shaft, and thus keeps the timber wet, and in such a shaft timber seems to last very well. Anything is better than to let the timber get alternately wet and dry, or alternately cold and hot. Considerable attempts have been made to preserve the timber by chemical means. In some of the salt mines they have found it advisable to steep the timber for some time in brine, and find that in an ordinary moist atmosphere it will last an amazing length of time; but the lecturer did not know that, on the whole, the advantages were so great as to counterbalance any great expense. Various other methods have been suggested, and one or two have given good results. One of these is a method which has been practised in Wicklow since the last century—that of steeping the timber in pools of water pumped from the mine, which water contains sulphate of iron and some sulphate of copper, and there is no doubt that the presence of the latter substance is very important. Sulphate of zinc and chloride of mercury have also been proposed, but most of these methods, unfortunately, are too expensive to be used for mine timber, which must be looked upon, after all, as only temporary, for it is all the time being split. In some cases the lecturer had known timber to be renewed three times in four months.

If you find some of the frames giving way, from one cause or other, it will be necessary to take off a certain length, which can usually be done with the assistance of a few struts, and then adopt some other means of securing, such as tubbing, brickwork, &c. When there is a considerable quantity of timber in the shaft, it necessitates the employment of a very valuable and ingenious class of men—timbermen, or shaftmen.

MINING NOTES.

THE COMSTOCK LODE.

We take the following from the *Gold Hill News* of the 21st ult.: The Consolidated Virginia Mine is yielding 250 tons of ore per day from the 1,400 and 1,550-feet levels. A drift has been started northward in the ore vein to connect with the south drift from the winze of the California Mine. The daily yield of this mine is 550 tons of ore, keeping the mills all crushing to their full capacities. The bottom of the winze sunk in the east drift on the 1,300-feet level of the Union Consolidated Mine has been connected with the north drift from the Mexican on the 1,465-feet level. This gives a much needed ventilation to both mines. The Diamond drill is at work in the Gould & Curry Mine. In the Savage and the Hale & Norcross mines the flood of water in the main inclines seriously interferes with the work. The Justice is yielding 350 tons of ore per day. The drifts north in the 600 and 700-feet levels are showing very rich ore. The water from the 1,000-feet level is being gradually drained.

The yield of the Chollar Potosi mine is equal to 100 tons per day, at an average assay value of $27 per ton, the ore being taken from the upper levels. The operations in the Ophir mine are principally confined to sinking and prospecting. About 25 tons of ore are extracted per day from the old workings on the 1,500-feet level.

Trojan Mine.—This mine is located on the Comstock Lode. The annual meeting of the company was held in San Francisco on the 17th ult. From the report of the secretary it appears that its expenses for the two years have been $90,440.69; receipts, $126,250. The assets of the company are $44,941.31, including $30,737.84 due the mine from the ex-treasurer, Pearson, for which there is an action pending in the Nineteenth District Court. The liabilities amount to $9,132, leaving in the treasurer's hands at present $12,750. There are 1,100 or 1,200 tons of ore on the dump. The north winze has reached a depth of 40 feet through ore averaging $40 a ton, and $80 ore has been struck at the bottom. The south winze, seven by nine feet, has reached a depth of fifty-four feet. The ore already stripped is estimated to be sufficient to run for seven months at one hundred tons a day.

The Sutro Tunnel Mortgage.—With reference to this mortgage we note that it covers all the property, franchises and improvements of the company, to secure a loan from the mortgagees to the company of $124,321.10 already made, and further advances to be made in the future. The loaning parties comprise the firm of McCalmont Brothers & Co., London, and the mortgage stipulates that they, or any of them, or person or persons who shall succeed them, may lend the company any further sums of money that may be required in "completing the said tunnel and works, or working and carrying on the business thereof, or in paying off any incumbrance or charge thereon, together with interest on the several moneys aforesaid at the rate of 12 per cent. per annum from the first day of January, 1879, with respect to moneys advanced before that day and from the respective days of loan, advance or payment of moneys loaned or advanced after that day, such interest to continue on the amount from time to time owing until complete re-payment by the said company, and to be paid in half-yearly payments on the first of January and the first of July in each year, the first payment to be made on the first of July, 1879."

THE ORE YIELD, VALUE, etc., of the mines of Storey County, Nevada, is given in the following statement, as taken from the quarterly assessment roll for the quarter ending December 31, 1876:

MINE.	Tons.	Value per ton	Gross yield.	Cost of extracting.	Cost of reduction.	Total Cost.	Value upon which taxes are levied.	Total amount of tax.
*Belcher	20,374	$16	$341,350	$336,994	$224,114	$461,108	$68,276	$1,673
California	44,755	83	3,725,124	.....	1,421,214	1,424,214	2,390,910	44,807
Con. Virginia	30,168	95	2,897,699	.....	929,749	929,747	1,067,953	38,375
†Crown Point	2,505	11	29,023	.. ....	57,228	57,227	2,962	73
*Chollar-Potosi	10,160	19	197,921	126,328	111,760	238,288	39,584	772
*Justice	22,512	26	600,954	‡ 247,632	238,890	517,778	120,193	2,944
*Ophir	17,356	24	422,478	173,562	258,273	381,835	84,496	1,648
Totals	147,836	.... ..	$8,215,159	$784,516	$3,214,228	$4,010,198	$4,584,358	$90,353

The proceeds of the tailings works for the same period were as under:

NAMES.	Tons.	Value per ton.	Gross yield.	Cost of reduction.	Am't deducted as provided by law.	Net yield on which taxes are levied.	Total amount of tax.
Express Mill	4,398	$9 00	$39,581 74	$33,173 30	.....	$6,408 44	$124 96
Jennings G. N.	97	13 00	1,261 00	1,164 00	80 per cent.	252 20	4 92
Omega Mill	1,607	9 00	15,204 55	13,684 09	.....	1,520 46	29 65
Railroad Mill	6,110	9 00	54,994 81	50,584 80	90 per cent.	5,499 48	107 24
Dickman, E	28	8 00	224 00	104 0	.....	120 00	2 34
Totals	12,240	.....	$111,366 10	$104,710 10	....	$13,800 58	$269 11

The superintendent of the Bonanza mines disputes the tax on their product as th law now reads. The following amendment to the present law is proposed: "A ores, tailings and mineral-bearing materials of whatever character, shall be assesse for purposes of taxation for State and county purposes in the following manner—O all ores, tailings or mineral-bearing material, the gross yield or value of which is $12 per ton or less, there shall be deducted the sum of 90 per centum of such gross yield, return or value. On all ores, etc., the gross yield or value of which is over $12 and under $30 per ton, there shall be deducted 80 per centum of such gross yield, value or return. On all ores, etc., the gross yield or value of which is over $20 and less than $100 per ton, there shall be deducted from such gross yield, value or return, 60 per centum. On all ores, etc., over $100 per ton, there shall be deducted 50 per centum of such gross yield, value or return. The remainder shall be deemed the net proceeds, and shall be assessed and taxed as provided for in this Act." The combined sum of unpaid taxes now due for the two Bonanza mines amounts to about $300,000.

MONTANA.—*The Mining Prospects of Butte.*—There are four quartz mills now in operation at Butte, carrying 33 stamps, built at a cost of probably $115,000, and having a productive capacity on 80-ounce ore of $2,500 to $3,000 per day. Two arrastras and a concentrating work have also been erected and operated successfully. Development of the leads has progressed continuously, and all promise well, the principal mines being La Plata, Lexington, Rainbow, Burlington, Travona, Neptune, Stevens, Late Acquisition and Spur, Anselmo, etc. The primary formations of these districts, of which Butte is the center, are of granite, most of the ledges showing on the surface. The mines contain mostly fine milling ore, some of them, however, carrying a small amount of manganese, but as a rule being free from base metals. All of the mills but one are working the ores without roasting, and saving from 70 to 90 per cent. of the assay value. The principal copper mines are the Parrott, Montana, Collusa, Gambetta, Original and the Poznainsky. Of the latter mine, which is characteristic of the others, the *Butte Miner* of the 13th ult. says: "We have been shown some very beautiful specimens of copper ore taken from the Poznainsky mine, Mountain lode, which are almost entirely covered with a film of silver. These specimens are also rich in copper, carrying nearly 60 per cent. of that metal. The value in silver is not known. The developments made consist of a shaft upon the vein, depth 110 feet, and levels at 45 feet and 100 feet from the surface."

The width of vein matter is not known, as in sinking the foot wall has been followed and ore taken out to a width of from five to eight feet without meeting with the hanging wall—no cross-cut having been made. The richest ore lies near the foo wall, and is a streak of black oxide, varying in width from 10 inches to 3 feet, whic averages about 43 per cent. copper. Of this ore some 250 tons have been taken out, while the output of second-class ore, running from 18 to 25 per cent., will amount to over 1,500 tons, the bulk of which now lies upon the dump awaiting the completion of concentrating works before it can be made available for shipment. The present daily output from this mine is about seven tons. At present there is no object in working the mine other than for ore carrying 30 per cent. copper, as anything les than that is not marketable here at the present time.

COAL PRODUCTION OF BRITISH COLUMBIA.—

	Collieries.			Total tons of 2,240 lb.
	Nanaimo.	Wellington.	Harewood.	
Exported	30,705·00	15,061·00	5,464·00	....
Domestic use	7,122·12	3,840·00	1,049·00	....
Total, six mos., July to Dec	37,827·12	18,901·00	6,514·00	....
Previous six months	40,708·10	32,034·00	2,102·00	....
Total, 1876	78,536·02	52,935·00	8,616·00	140,087
Total, 1875	....	....	....	113,000
Total, 1874	....	....	....	81,397

The large decrease in the shipments from the Wellington Colliery was caused by the strike and the fire in the mine.

The *British Colonist* of the 14th inst., in commenting on the above, says: "In the face of the enormous receipts of coal at San Francisco from Great Britain and Australia, it is a matter of extreme satisfaction to find that Nanaimo has not only held her own, but that she has exported 27,087 tons more in 1876 than in 1875, and nearly 59,000 tons more in 1876 than in 1874. What is worthy of remark from the totals is the evident favor with which our coal is regarded over any similar coast production in the San Francisco market. To superior quality, and to that alone, is due the increase in the shipments. We are reminded that prices have ruled low, but that fact is attributable to the scarcity of wheat in Europe, which enabled ships coming to California for cargoes to bring coal as ballast."

* 80 per cent. of the product of this company is deducted by law.
† 90 per cent. of the product of this company is deducted by law.
‡ $11,256 appears on the expense account of this company as transportation charges.

NOTES.

SWEDISH WOOD-OIL MANUFACTURE.—A cheap non-explosive oil from wood, chiefly pine, is now extracted in Sweden in fifteen factories, with favorable results.

MINERS WANTED IN NEVADA.—The Borax *Miner* says there is a scarcity of hands at Belville (Esmeralda County), where it is safe to say one hundred or more additional miners could find employment.

COAL ON THE MISSISSIPPI.—The cost of transportation of coal between Pittsburg and New Orleans is worthy of remark. The actual cost of transporting coal between Pittsburg and Louisville is as low as 1¾ cents per bushel, including the return of empty craft, equal to 47 cents per ton, a distance of 600 miles, while the cost of transporting coal from Louisville to New Orleans, a distance of 1,400 miles, is 2 cents per bushel—55 cents per ton. At the lowest rate of railroad transportation, 55 cents would not transport a ton of coal 60 miles. There is no such cheap and speedy transportation elsewhere in the world for bulky freight, the passage from Pittsburg to Louisville requiring less than five days, and from Louisville to New Orleans less than ten days, under circumstances at all favorable. Bridge obstructions between Pittsburg and Louisville increasing the average trip one day, and the same at the falls delaying tows more or less at that point.

THE OLDEST PIECES OF IRON (wrought iron) now known are probably the sickle-blade found by Belzoni under the base of a sphinx in Karnac, near Thebes; the blade found by Colonel Vyse, imbedded in the masonry of the Great Pyramid; the portion of a cross-cut saw exhumed at Nimrod by Mr. Layard—all of which are now in the British Museum. A wrought bar of Damascus steel was presented by King Porus to Alexander the Great; and the razor-steel of China for many centuries has surpassed all European steel in temper and durability of edge. The Hindoos appear to have made wrought iron directly from the ore, without passing it through the furnace, from time immemorial; and elaborately-wrought masses of iron are still found in India which date from the early centuries of the Christian Era.—*The Bulletin.*

LYKENS VALLEY FIRE.—The *Record* of the 22d inst. says: The fire in the mines has been extinguished, but there are very few indications of a revival of the coal trade in this locality. The Summit Branch Colliery likewise is in operation only about two days in the week. Considerable suffering to miners and laborers is the inevitable consequence.

[If the fire is really extinguished we would like to have the particulars by which this remarkable result was attained. In the meantime our experience with coal mine fires leads us to think our contemporary's announcement is "premature."—ED. E. & M. J.]

THE AGE OF THE EARTH is estimated from the increment in the temperature as we penetrate its crust. The rate at which the earth cools can only be determined by making use of data confessedly imperfect, and from these Sir Wm. Thomson finds that 100,000,000 or 200,000,000 years ago it first began to be crusted over by a solid film of rocks; that 10,000 years after its first crusting over the temperature of the crust increased 2 degs. Fahr. for every foot vertically descended below the zone of constant temperature The rate of increase for descent with successive periods is shown in the following table:

Years after crusting over.	Degs. Fahr.
10,000....Increase in temperature per foot descent	2
40,000	1
160,000	½
4,000,000	1-10
100,000,000	1-51

1-51 of a degree being the present rate of increase.

—*Colliery Guardian.*

DEPOSITS AT THE UNITED STATES ASSAY OFFICE at New York for the month ending February 28, 1877:

Deposits of Gold.

Foreign coin	$56,500	United States bullion (redeposits)	$35,500
Foreign bullion	37,000	Jeweler's bars	42,000
United States bullion	270,000		
			$441,000

Deposits of Silver.

Jeweler's bars	$14,000	U. S. bullion (Montana)	$60,000
Foreign coin	2,400	U. S. bullion (Nevada)	14,000
Foreign bullion	16,500	U. S. bullion (New Mexico)	27,000
U. S. bullion (contained in gold)	3,000	U. S. bullion (Utah)	145,000
U. S. bullion (redeposits)	12,000	U. S. bullion (Arizona)	3,000
U. S. bullion (Colorado)	213,100		
U. S. bullion (Lake Superior)	1,000		$511,000

Total deposits	$952,000
Silver bars stamped	$374,582 66

GLASS-WOOL has received a new application in the laboratories of Austria with great success, the glass being drawn so fine that it may be compared to the fibres of silk, wool, or cotton. The process by which it is manufactured is not well known, and is kept a secret as much as possible by the two firms in Bohemia that provide the market with it. It is, however, said to be made by winding fine threads of nearly melted glass upon rapidly rotating heated cylinders. When seen in a mass, it looks like cotton; its fibres are more easily snapped by tensile strain than by bending, and it has not the appearance of a mineral substance. As it resists the action of nearly all chemical substances, it admits of being employed in the laboratories for the filtering of unstable solutions, and cleaned again after each operation by merely letting pure water run through. If an insoluble compound is to be calcined on the filter on which it was collected, it will be obtained quite clean, save a small glass button representing the molten fibres. Unalterable brushes are also made of the same material.—*The Engineer.*

PREPARATION OF THE EARTHY METALS IN THE CHEMICAL WORKS OF DR. SCHUCHARDT, AT GORLITZ.—E. Frey in *Liebig's Annalen.*—Calcium, strontium, lithium, and cerium are prepared in quantity in this establishment by Bunsen's electrolytic process. A current of 60° is found more serviceable than one of 90°, as originally recommended by Bunsen. Calcium is not of a brassy yellow, but exactly resembles aluminum in appearance. It is brittle, and cannot be laminated or drawn out to wire. Strontium is a pale brassy-yellow metal, very pliable, and capable of being rolled and drawn, but it oxidizes more readily than calcium. Barium has not yet been obtained by this process in a compact state, owing to its elevated melting-point, which appears to be higher than that of cast-iron. From the amalgam the metal was obtained not in a fused, but in a fritted state, in masses exceeding 100 grms. in weight. This was effected by distilling off the mercury in a wrought-iron retort, fitted with a ground lid, into which two iron tubes were screwed. The retort, coated with clay, was exposed to the most intense heat, whilst a continuous current of dry hydrogen was passed through it. Small globules of lithium were fused in an iron capsule to masses of nearly 2 grms. in weight. Cerium prepared by the electrolytic process has all the properties described by Wœhler in 1867. It is particularly distinguished by its brilliant and explosive combustion.

THE SWISS SHORT-LABOR-HOURS BILL.—There are some noteworthy clauses in this bill, nearly the whole of which has already been adopted by the National Council. The day's work of none—adults of both sexes included—is to exceed eleven hours, and, as a rule, there is to be no Sunday or night work, the hours of labor being restricted within the time between 5 o'clock A.M. and 8 o'clock P.M. Under certain specified circumstances factory inspectors will be empowered to permit exceptions to this rule, but only so far as regards men—the law forbidding women and children to work during the night and on Sundays is absolute. Women cannot, with one exception, be employed within eight weeks before or after their confinement. The exception is, that on production of the surgeon's certificate testifying to their complete recovery, they may return to work six weeks after. Women who have households are to be allowed to leave their work half an hour before the noon stopping time. In a certain class of establishments the employment of pregnant women is absolutely forbidden. These establishments will hereafter be named by the Federal Council. Women are not to be allowed to clean engines, shafting in motion, or dangerous machinery. The clauses touching the employment of children have not yet been fully adopted by the National Council, but it is proposed and the proposition will probably be accepted, that no child shall be employed in any factory before full completion of its fourteenth year. The law establishing a "normal working day" for men is applicable to all factories and workshops in which more than five people are employed.—*Capital and Labour.*

THE PRINCIPLE OF A PRISMOIDAL OR SINGLE-TRACK RAILWAY has been put to practical test by the recent opening of a road of the Sonoma Valley Prismoidal Railway of California, from Norfolk, on Sonoma creek 3¼ miles towards Sonoma. The rail is laid upon a prism of wood built of bevelled boards, 27in. wide at the base, and 15in. high. The car is supported by two wheels, with independent revolving flanges. A San Francisco paper thus describes the result of the trial trip:—"The party took their places on seats which were ranged on each side of the cars, the passengers being face to face. The first impression suggested was that which ordinarily fills the bosom of the novice who makes his maiden effort to ride the uncertain bicycle. A certain assurance that the whole thing would topple over at the first movement was the general belief of the uninitiated. But the engineer sounded his whistle, the passengers gave their tremulous cheers, and the train moved off smoothly, and soon the pace was considerably augmented. Wonderful to relate, the oscillation was scarcely perceptible, and the locomotive and cars rode the single rail as firmly as the trains on the broadest of English solidly constructed broad gauges. The faster the train proceeded the smaller in number and extent became the lateral oscillations, beautifully and practically exemplifying the great principle of the whole prismoidal system, that the greater the speed the less the liability to oscillate, a principle clearly demonstrated by the gyroscope and velocipede. To those making their first trip on the new railroad the ease and comfort of this mode of travelling suggested itself most strikingly." It is stated that the construction of this road for the 3¼ miles already built has cost about $4,500 per mile, or little more than one-half the cost of a narrow gauge road through ordinarily difficult country. The one-rail system is especially adapted to mountainous regions, where numerous heavy grades and sharp curves are necessary, and where the cost of an ordinary railroad would be enormous.—*The Engineer.*

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Feb. 24.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.*	Week.	Year.*
Wyoming Region.				
D. and H. Canal Co.	35,983	280,603	—	240,856
D. L. and W. RR. Co.	39,000	286,120	4,986	192,337
Penn. Coal Co	13,323	117,155	23,360	173,195
L. V. RR. Co	14,754	143,078	15	114,754
P. and N. Y. RR. Co.	—	5,602	—	3,952
C. RR. of N. J	28,283	147,041	—	114,449
	132,343	979,599	28,361	839,553
Lehigh Region.				
L. V. RR. Co	53,524	332,577	7,634	211,285
C. RR. of N. J	19,410	124,370	63	138,896
D. H. and W. B. RR.	—	2,657	774	3,522
	72,934	459,604	8,471	353,703
Schuylkill Region.				
P. and R. R. RR. Co	68,026	540,334	7,053	261,275
Shamokin & Lykens Val.	2,858	51,299	—	24,365
	70,884	581,633	7,053	285,640
Sullivan Region.				
Sul. and Erie RR. Co.	222	1,983	351	8,380
Total	276,383	2,022,819	44,236	1,487,276
Increase	232,147	535,543	—	—
Decrease	—	—	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 29,111 tons, as compared with the corresponding period in 1876.

Belvidere Delaware RR. report.	Week.	Year 1877.	Year 1876.
Receipts of coal at Coal Port (Trenton)	—	—	4,701
" " " South Amboy	14,965	65,111	81,830
Shipments at Coal Port (Trenton)	—	—	—
" South Amboy	12,295	67,575	42,932

Perth Amboy business:

	Tons.
Received for the week	23,940
Shipped for the week	13,236
On hand Feb. 24	101,821

The Production of Bituminous Coal for the week ending Feb. 24 was as follows:

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week, Tons.	Year, Tons.
Tons of 2,240 lb	4,348	99,500
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	6,360	59,894
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	2,811	18,989
*East Broad Top	191	5,389
Clearfield Region, Pa.		
*Snow Shoe	1,039	7,418
*Tyrone and Clearfield	33,369	150,062
Allegheny Region, Pa.		
*Pennsylvania RR	4,651	23,673
Pittsburgh Region, Pa.		
*West Penn. RR	3,098	26,590
*Southwest Penn. RR	1,081	9 198
*Penn. & Westmoreland gas coal, Pa. RR.	13,548	118,938
*Pennsylvania RR	7,125	50,269

*For the week ending Feb. 14

The Production of Coke for the week ending Feb. 14.

Tons of 2000 lb.	Week.	Year.
West Penn. RR	805	10,299
Southwest Penn. RR	12,804	79,466
Penn. & Westmoreland Region, Penn. RR.	3,041	11,518
Pittsburgh, Penn. RR	2,574	24,382
Total	19,224	125,665

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, March 2, 1877.

Anthracite.

The attention of the trade has been almost wholly centered on the auction sales, there having been but little business previous to them and not much improvement since.

The Pennsylvania Coal Company announced on Wednesday morning that it would sell at auction 65 000 tons of coal. The sale was opened by offering 35,000 tons with the choice of Lump, St. Bt., Grate, Egg and Chestnut, and limiting the quantity of Chestnut to be disposed of to 6,000 tons and Egg 7,000 tons. There was active bidding, and the price was run up to $3.25, and 5,000 tons of Chestnut were taken by Mr. A. S. Swords; after which 1,000 tons were sold at $3.30. This was followed by purchases for blast furnace use of two 5,000 ton lots of Lump at $2.97½ and 3,000 tons at $2.95. This left a choice from the comparatively small quantity of 16,000 tons of Steamer grate and Egg for which there was ac-

tive bidding resulting in an advance on all sizes and a quick disposal of the balance. After this 30,000 tons of Stove were offered, leading off with a sale of 5,000 tons at $3.45 and steadily advancing to $3.52½ at which price 500 tons were taken and declining to $3.47½ at which the closing sales were made.

The following quantities were sold at the annexed average prices. Comparison is made with the average prices received Jan 24:

Tons.		Feb. 28.	Jan. 24.
13,000	Lump	$2.970	
2,600	Steamer	2 921	$2 82½
10,000	Grate	2.921	2 82½
7,150	Egg	2.939	2.88½
32,800	Stove	3.477	3 45
6,000	Chestnut	3 258	

Total 71,550 tons

So far as we can make comparisons with the sale of Jan. 24 we find that the prices at Wednesday's sale advanced on Steamer about 9½c.; Grate, 9½c.; Egg, 6c.; and Stove, 2¾c., while the prices received for Lump and Chestnut sizes were even more satisfactory. In case the coal can be delivered from Newburg 20c. per ton will be deducted from the above prices.

The Delaware, Lackawanna & Western Railroad Company offered on Wednesday at noon 100,000 tons of its coal. The bidding was fairly active, and the following quantities were disposed of at the annexed average prices, comparison being made with the prices realized at the same company's sale January 24:

Tons.		Feb. 28.	Jan 24.
10,000	Steamer	$2 82½	$2 65
25,000	Grate	2 77½	2 67
15,000	Egg	2 92¼	2 82½
10,000	Chestnut	3 18	3 05¾
40,000	Stove	3 49¾	3 46¼

The above figures show advances at Wednesday's sale of 17¼c. on Steamer, 19½c. on Grate, 9¾c. on Egg, 3¼c. on Stove, and 12¼c. on chestnut.

An advance in the Pittston prices might fairly have been anticipated, owing to the small quantity of coal offered and the opening of a new market on the Hudson. The advance in Scranton prices, however, was unexpected by many, and cannot be satisfactorily accounted for now. The market that this company depends upon to take its coal has been thoroughly overrun with the representatives of other companies offering coal at very low prices, and buyers are well aware of the immense stocks of coal that are awaiting disposal. Upon the morning of the sale coal was freely offered at less than the average received at auction, and after the sale, even upon the same day, Scranton coal was offered at less than auction prices, while stove coal is reported to be selling now at 20c. under these prices. It is said that a large portion of the coal sold at the Jannary sales has not been taken, and that many bidders were not compelled to forfeit 50c. per ton as specified in the terms of sale. If such is the case it is not strange that the appearance of activity and higher prices can be readily brought about.

The Delaware & Hudson Canal Company announces the following prices:

Furnace lump	$2 95
Steamer "	2 95
Grate	2 95
Egg	3 00
Stove	3 60
Chestnut	3 35

These show advances over the previous circular rates of 20c. per ton on Furnace, Steamer, Lump and Grate, and 10c. per ton on Egg; Stove and Chestnut remaining unchanged.

The Lehigh and Wilkes-Barre Coal Company announces the following prices for Wilkes-Barre coal:

Lump	$3 00
Steamer	3 00
Broken	3 00
Egg	3 10
Stove	3 65
Chestnut	3 25

These prices are advanced over this company's previous circular 15c. per ton on Lump, Steamer and Broken, and 10c. per ton on Egg, Stove and Chestnut remaining unchanged Plymouth red ash coal is advanced 15c. on Broken, and 10c. on Egg. Lehigh coals remain unchanged.

Mr. A. S. Swords announces that shipments can be made at once from Newburg, and quotes Pittston coal, f. o. b. there, as follows:

Lump	$2 85	Egg	$2 95
Steamer	2 85	Stove	3 50
Grate	2 85	Chestnut	3 25

The Pennsylvania Coal Company quotes Pittston coal at Newburg as follows:

Lump	$3 10	Stove	$3 60
Steamer	3 10	Chestnut	3 25
Grate	3 10	Pea	2 75

Messrs. Meeker & Dean quote Wilkes-Barre coal as follows:

Lump	$2 85	Egg	$3 00
Steamer	2 85	Stove	3 60
Broken	2 90	Chesnut	3 25

The production of anthracite coal for the week ending February 24 was 276,383 tons as against 278,322 tons for the previous week, and 44,236 tons for the corresponding week of 1876. The total production from January 1 to February 24 was 2,022,819 tons as against 1,487,276 tons for the corresponding period of 1876, showing an increase this year of 535,543 tons. The cause of the rapid increase this year is, that during 1876 the production was very much reduced (it was called "a total suspension") for a period of six weeks, beginning February 7, and ending March 18. Should the present rate of production continue, by the middle of March the statistics will show an excess this year, over 1876, of more than a million tons.

Bituminous.

This branch of the coal trade bears a very quiet appearance. The Cumberland production last week was but 4,348 tons, while the Clearfield region for the week ending February 14 (the last report received) was 33,369 tons, the largest week's output ever made from that region. The total production from January 1 to February 14 was 150,062 tons, as against 108,198 tons for the like period of 1876, showing an increase this year of 41,864 tons, or nearly 39 per cent. The history of this trade during two or three years back has been a remarkable one, and speaks well for the coal and for the enterprise of those who have been interested in its introduction.

The strike in the Cumberland region continues. The Baltimore & Ohio Railroad Company, believing that the men must submit to the reduction demanded, provided all the companies will hold out, has taken the regulation of the question into its own hands by practically refusing transportation to those who desire to work their mines at the higher rates of wages. Although the reduction in wages asked is a moderate and much needed one, yet this mode of enforcing it is no less tyrannical than a refusal by the men to allow others to accept less than their standard wages, and it will certainly react upon the company and contribute towards building the opposition line proposed, as the George's Creek and Cumberland Railroad. It shows what may be expected so long as the field is dependent on a single outlet to market.

Nothing has been done towards fixing upon freights or prices for gas coals, and there are no positive signs as to when action will be taken.

New York.

Wholesale Prices of Anthracite Coal f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Weehawken	2 95	2 95	2 95	3 00	3 60	3 35
Wilkesbarre at Port Johnston	3 00	3 00	3 00	3 10	3 65	3 25
Plymouth, R. A.	....	....	3 00	3 10	3 75	3 35
Susque: Coal Co., (S. H. Brown & Co.,) at Amboy	2 80	2 80	2 80	2 95	3 50	3 20
Kingston at Hoboken	2 85	2 85	2 90	3 00	3 60	3 25
Pittston at Newburgh ·						
A. S. Swords	2 85	2 85	2 85	2 95	3 50	3 25
Penn. Coal Co.	3 10	3 10	3 10	3 20	3 60	3 25
Lehigh Coals.						
Old Company at Port Johnston	3 75	....	3 25	3 25	3 65	3 25
Old Company's Room Run "	3 75	....	3 25	3 25	3 65	3 25
Sugar Loaf, Hobok. & Amb. "	3 75	....	3 25	3 25	3 65	3 25
Lehigh Coal Exchange "	3 75	....	3 25	3 25	3 75	3 50
Honey Brook Lehigh	3 75	....	3 25	3 25	3 65	3 25
Beaver Meadow at South Amboy	3 75	....	3 25	3 25	3 65	3 25
Mount Pleasant at Hoboken	3 75	....	3 15	3 15	3 50	3 30
Cross Creek at Elizabethport	3 75	....	3 25	3 25	3 75	3 25
Schuylkill Coals at South Amboy.						
Schuylkill white ash	2 75	2 75	2 75	2 90	3 60	3 25
Schuylkill red ash	....	....	....	....	....	....
Lorberry	....	....	....	....	....	....
Lykens Valley	....	....		....	....	....

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

Per ton.

Freight from Hoboken and Weehawken to New York 35@40c.
" " Elizabethport & Port Johnston to N. Y. 35@40c.
" " South Amboy to New York. 35@40c.

Freight by the boats of the companies from Hoboken, Rondout, Port Johnston, Weehawken, South Amboy and Perth Amboy to New York City and vicinity 50c.

Pittston coal at New York delivered by Penn. Coal Co.'s boats 60c. per ton additional.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt.	4 25	5 65
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	6 00	7 00
" Gas Coal at Richmond.	4 15	5 65
Peytona Cannel W. Va at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va.	3 50@3 75	5 20
Cumberland, at Baltimore	3 75@3 90	5 00
Clearfield f.o.b. Canton, Baltimore	3 50@....	5 00

Pennsylvania Semi-Bituminous Coals.

At the mines, per 2,000 lb., 90c.@1 f.o.b. at Greenwich, Phila., for Eastern and foreign shipments, per 2240 lb. $3 25@3 35 for Sound ports, 3 50@3 65, f.o.b., at South Amboy, N. J., per 2,240 lb., $4 10@4 75. Discharged, in New York, per 2,240 lb., $5 00@5 15.

Foreign Gas Coals.

	Sterling.	Am. cur cy.
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S.	1 75	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$3 90	$4 20	$3 90
Lackawanna coal, in yard	3 50	4 00	3 90
Wilkes-Barre, delivered	5 00	5 30	4 60
Lehigh & Locust Mountain, del'd.	5 50	5 50	5 00
Schuylkill Red Ash, del'd	5 25	5 50	4 75

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb				$18 00
Liverpool House Cannel	"	"	"	.... 18 00
American	"	"	"	.... 11 00
Cannelton Block, or splint,	"	"	"	.... 10 00
American Orrel	"	"	"	....11@14
Red Bank Cannel	"	"	"	.... 10 00
Cumberland	"	"	"	 00

Baltimore, Md. Feb. 28, 1877.

Specially Reported by Messrs. E. STABLER & Co.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Boston" Vein, and Plymouth White Ash.

In cars at depot.		In cars at depot.	
Lump	$3 85	Egg	$4 10
Steamboat	4 10	Stove	4 60
Broken	4 10	Nut	4 10

Shamokin, red or white ash.

Egg	4 30	Stove	4 60

Lykens Valley, red ash,

Egg and stove	5 35

From wharf or yard, wholesale, 50@75c. additional.

By retail, all kinds and sizes, per 2240 lb. $6 00@7 50

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point	3 75@4 00
West Virginia Gas f. o. b. at Locust Point	4 50
Youghiogheny Gas, f. o. b. at Locust Point	4 50
Swanton	4 00

Boston, Mass. Feb. 24, 1877.

Coal is weak, partly because of the advices from New York and the mining districts, and partly because of the large stock and mild weather here. Freights are dull and lower. Soft coals are easy.

We quote Boston wholesale price as follows:

Anthracite, broken	4 50@5 00	Cannel, English	14 00@15 00
do egg	4 50@8 20	Do. Buckeye	10 00
do stove	5 25@5 75	Lingan	4 75@5 00
Cumberland	....	Pictou	5 50
Clearfield	5 50	Penn.	6 50
Westmoreland	5 75	Youghiogheny	5 25@6 25
Caledonia	4 50@4 75		

—*Commercial Bulletin.*

Buffalo, N. Y. March 2, 1877.

Specially reported by Messrs. PALEN & BURNS, 246 Washington street.

No change in prices, market inactive, sales light.

ANTHRACITE.

	To Dealers. On Car or Boat.	To Dealers. In Yard, screened.	To Consumers. Delivered at retail.
Grate	$4 55	$4 75	$5 80
Egg	4 65	4 85	5 90
Stove	5 15	5 35	6 40
Chestnut	5 15	5 35	6 40

BITUMINOUS.

	car lots.	Retail, delivered
Brier Hill, lump	$4 10	$6 00
Brookfield, "	4 15	6 00
Screened nut, Brookfield	3 00	4 50
Nut and slack, "	2 75	3 50
Reynoldsvile, lump	3 50	4 50
Buck Eye (Ohio), lump	3 50	4 50
Cannel	5 25	7 00
Connellsville Coke	5 10	.. ..

Chicago, Ill. Feb. 27, 1877.

Specially reported by Messrs. RENO & LITTLE.

Lackawanna Stove	$8 00	Erie and Brier Hill	$6 00
" Chestnut	8 00	Wilmington & Ill.	3 50@ 4 25
" Grate & Egg	7 50	Blossburgh	7 00

Cincinnati, O. Feb. 27, 1877.

Specially Reported by Messrs. A. BUCHANAN & Co.

The following are coal quotations to-day:

	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	@10c.	—
Pomeroy coal	@8½c.	—
Kanawha "	8c.	—
Ohio River Coal	—c.	—
Cannel coal, according to quality	@16c.	—

The following are the retail prices delivered

Youghiogheny	13c.	$3 50
Pomeroy	10c.	2 50
Cannel	16@22c.	—
Kanawha	11c.	3 50
Anthracite, per ton		@$9 50
Coke, at yard	9c.	—
Coke, hard and soft, delivered	10c.	—

Cleveland, O. Feb. 27, 1877.

Specially reported by Messrs. LAMBIE & BATES.

The following are the prices established by the Coal Exchange until further notice:

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	1 to 10 tons	10 tons upw'd.
Brier Hill lump	$4 25	$4 00
" " nut	3 75	3 50
Massillon and Mineral Ridge lump	4 00	3 75
" " nut	3 75	3 50
Straitsville Lower Vein, Hocking & Shawnee, Pp.	3 60	3 35
" " " " nut	3 40	3 15
Del Carbo lump	3 75	3 50
" " nut	3 50	3 25
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 25	7 00

Lehigh to be $1 25 per ton higher.
All sales to be strictly cash with order or C. O. D.

Indianapolis, Ind. Feb. 27, 1877.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers.

Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton	$2 75	Peytona cannel, per ton.	$5 75
Brazil Block, "	2 75	Indiana Cannel	4 5c
Highland, grate, "	2 50	Hocking Valley	4 25
Block coal, nut, per car	18 00	Youghiogheny	4 50
Highland " "	18 00	Blossburg (smithing)	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$7 70	Nut	$6 70
Egg	6 70	Stove	6 70

Lehigh Anthracite.

Broken	$7 60	Nut	$7 30
Egg	7 60	Stove	7 70

Retail, per bushel, delivered.

Sand Creek	15c.	Block Nut, steam	1c.
White River	13	" Slack, "	7
Brazil Block	13	Peytona Cannel	—
Highland grate	12	Virginia "	27
Block Nut, domestic use	11	Youghiogheny	16
Highland Nut, " "	11	Blossburg	26
" " steam	8	Piedmont	26

GAS COKE (measured.)

Crushed	14c.	Lump	12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes)	$7 50 per ton.
Lehigh, retail	8 50 per ton

Louisville, Ky. Feb. 27, 1877.

Specially reported by Messrs. BYRNE & SPEED.

WHOLESALE.

	per bushel		per bushel
Pittsburg	6½c.	Pine Hill	—
Raymond City	6½c.	Kentucky	7c

RETAIL.

	per bushel		per bushel
Pittsburgh	10c.	Peytona Cannel	18c.
Raymond City	10c.	Buckeye "	
Pine Hill	13c.	City-made Coke	8c.
Kentucky	9c.	Anth., per ton, $10 00 to 10	5c
Screened Pittsburgh per load			$3 50
Screened Raymond City			2 50
Pine Hill (Kentucky)			2 25
Cannel			4 50
City-made Coke			4 00

Milwaukee, Wis. Feb. 27, 1877.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail price per ton of 2000 lb.

Lehigh Lump	$ 8 00	Briar Hill, select	$7 00
Lehigh Prepared	9 00	Blossburgh	7 00
Lackawanna (all sizes)	8 00	Cannel	6 00
Pittston	8 00	Pittsburgh	6 50
Scranton	8 00	Oak Hill	6 00
		Steam coal	4@5 00

New Orleans, La. Feb. 26, 1876.

Specially Reported by Messrs. C. A. MILTENBERGER & Co.

Pittsburg coal, wholesale, by boat-load, per bbl	50c
" steamboats, per bbl	75c.
" to manufacturers, per bbl	75c.
" to families	$1 00
" shipments, per hhd	$8 00
Anthracite, wholesale, per ton	7@8 00
" retail, "	11 00
Virginia Cannel, retail, per bbl	1 25
Scotch " "	
Mt. Carbon, wholesale, per bbl	
" " retail, "	
St. Bernard wholesale, per bbl	—c.
" steamboat	50c.
" retail "	70c.

Philadelphia, Pa. Mar. 1, 1877.

From our Special Correspondent.

Coal is at a stand-still; not only consumers are not buying and dealers are full, but there is great uncertainty for the future, and an accumulating of stock at the shipping points which prevents sales. Rumors of a new combination are again revived. The Reading is reported to have made some very low sales, and some contracts have been secured at very low rates. The Water-works received bids lately for 20,000 tons of broken delivered at the different works in this city, and secured their supply at rates averaging from $3 01 to $3.49, the bulk of it at $3.01 to $3.04 per gross ton. We do not recollect of this contract ever having been taken so low. The slight advance at auction has not imparted any spirit to the producers. Your late remark that the Reading could put coal at tidewater cheaper than any other of the coal roads is perfectly correct, but the trouble with the road is that they never gave their customers the benefit of their advantageous position. If they had they would not have been compelled to make the experiments which have drawn them to their present shaky condition. To argue that you possess such advantages is one thing, and to prove it is another. For instance, at present a ton of coal can be sent from Mauch Chunk to Perth Amboy and be put on board for $1.12—distance, 112 miles. From Schuylkill Haven to Port Richmond it costs $1.15 to put a ton on board, and the distance is 90 miles. Besides it must be borne in mind that tidewater at Philadelphia is a different thing from tidewater at New York for the great eastern markets, the difference averaging 35c. against Philadelphia, and sometimes exceeding 50c. The new tolls are anxiously looked for. Freights are now $1.75 to Boston, and $1.50 to Providence. To Richmond and Washington, $1.00, and Norfolk, 80c.

Pittston, Pa. Feb. 27, 1877.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional

Richmond, Va. Feb. 27, 1877.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 40
Coalburgh Splint	5 70	Clover Hill Coal	3 50
Lewiston "	5 70	James River Bitum	3 30
Kanawha Gas coal	4 90	" " Carbonite,	5 00

San Francisco, Cal.

From the *Commercial Herald*, Feb. 22, 1877.

COAL—Imports from Jan. 1st to Feb. 15:

	Tons.		Tons
Anthracite	1,665	Mt. Diablo	5,303
Australian	15,473	Vancouver Island	10,975
Coos Bay	3,452	Rocky Mountain	20
Cumberland	3,974	Seattle	14,225
English	4,965		

The present spot market is very sluggish, with free supplies of Nanaimo for the Pacific Mail Company But little *Australian* is now arriving, while the receipts of Scotch and English steam are much less than for some time past. There is an improved demand for English steam cargoes to arrive, prices having risen from $7.50 to $8.50; Scotch, $8.50; West Hartley, $9; Wallsend, $9; Australian steam, $8.75@9.

St. Louis, Mo. Feb. 27, 1877.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered. Ton of 2,000 lb.

ANTHRACITE. per ton.

Lackawanna	$9 00@10 00	Schuylkill	9 00@10 00
Wilkes-Barre	9 00@10 00	Lehigh	10 00@10 50

BITUMINOUS.

Blossburg	9 00	Big Meadow	3 00
Pittsburg	4 50	Illinois Coals	2 50@3 00
Indiana Block	4 00	Connellsville Coke	8 50

Toledo, Ohio. Feb. 27, 1877.

Specially reported by Messrs. GOSLINE & BARBOUR.

We quote as follows for retail delivery:

Ton of 2,000 lb.

Lackawanna lump	$6 75	Lehigh lump	$7 75
" egg	6 75	" egg	7 75
" stove	7 00	" stove	8 00
" chestnut	6 75	" chestnut	7 75

Soft Coal.

Hocking lump	4 00	Brier Hill	5 75
" nut	4 00	Blossburg	8 00
Willow Bank lump	4 50	Cumberland	8 00
" " nut	4 00		

Toronto, Canada. Feb. 24, 1877.

Scranton and Lackawanna,	Grate and Egg	$5 50	
" " "	Stove	6 00	
" " "	Chestnut	5 75	
Lehigh Lump		7 00	
Soft coals (Briar Hill and Massilon) screened for house use		6 00	

Hamilton, Ont. Feb. 27, 1876.

Specially reported by H. BARNARD, Dealer in Coal.

Stocks are low, and will all be sold out this season.

Retail, per ton of 2,000 lb.

Grate	$6 00	Smithing	6 00
Egg	6 00	Bituminous retail	6 00
Stove	6 50	" steam	4 00
Nut	6 50	Coke	6 75
Lehigh Lump	6 50		

Montreal, Canada. Feb. 27, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

The long continuance of mild weather has had a depressing effect on the coal trade, and it appears probable that large stocks will be left in hand at the opening of navigation. There is but little demand for steam coal, and the supply is far in excess of requirements. The Grand Trunk Railway will advertise March 1st for tenders for their annual supplies of coal. We quote:

Wholesale per ton of 2240 lb.

Scotch Steam	$5 00	Cape Breton Steam	
Pictou "	4 75	Newcastle Smiths	

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 50	Chestnut	
Stove	7 00		

Freights

Representing the latest actual charters up to March. 2,

Per Ton of 2240 lb.

Ports.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	....	....	....
Albany	....	....	....	....
Alexandria	1 15	....	....	....
Amesbury, Mass	....	....	....	....
Bangor, Me	....	....	....	....
Bath, Me	....	....	....	....
Baltimore	2@2 10§	....	....	....
Boston, Mass	....	1 50	....	1.40-1.50
Bridgeport, Ct	....	1 35	....	....
Bristol, R. I.	....	....	....	....
Cambridgeport, Mass.	....	....	....	....
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	....	....	....	....
Fall River	....	1 40	....	....
Hackensack	....	....	....	....
Hallowell, Me	....	....	....	....
Hartford	....	....	....	....
Hoboken	....	....	....	35
Hudson	....	....	....	....
Jersey City	....	....	....	35
Lynn, Mass	1 95@2 00	....	....	....
Middletown	....	....	....	....
Mystic	....	....	....	....
Newark	....	....	....	....
New Bedford	....	1 40	....	....
Newburyport	....	1 75	....	....
New Haven	....	1 35	....	5 @60
New London	....	1 35	....	....
Newport	....	....	....	....
New York	....	1 35	....	35
Norfolk	1 00	....	....	....
Norwalk	....	....	....	....
Norwich	....	....	....	....
Pawtucket	....	....	....	....
Philadelphia	....	....	....	....
Portland	....	1 50	....	....
Portsmouth, N. H.	....	1 75	....	....
Providence	....	1 33	....	80
Poughkeepsie, N. Y.	....	....	....	....
Rockport	....	....	....	....
Saco	....	....	....	....
Sag Harbor	....	....	....	....
Salem, Mass	....	1 50	....	....
Salisbury Pt., Mass.	....	....	....	....
Stamford	....	....	....	....
Stonington	....	....	....	....
St. Johns, N.B.	2 12½	....	....	....
Taunton	....	....	....	....
Troy	....	....	....	....
Warren, R. I.	....	....	....	....
Wareham	....	....	....	....
Washington	1 00	....	....	....
Weymouth	....	....	....	....
Wilmington, N.C.	1 50	....	....	....

*And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

Rates of Transportation on Anthracite Coal to Tide Ports.

PHILADELPHIA AND READING RAILROAD CO.
General Office, 227 South Fourth Street.
PHILADELPHIA, Dec. 18, 1876.

From and after this date, and until further notice, shipments of anthracite coal can be made through by rail to South Amboy, via Richmond Junction, at the following rates, per ton of 2,240 pounds, in company's car:

From Schuylkill Haven	$1 52
" Tamaqua	1 67
" Pine Grove	1 72
" Port Richmond	65

An additional charge of twenty-five cents per ton will be made on chestnut and pea coal, unless the shipper signs the usual release.

The release now in force will apply to this trade.

(By order of the Board of Managers),
DAVID BROWN, Secretary.

Lehigh and Wyoming Coals.

per ton of 2240 lb.

	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey	1 62	1 48	2 04	1 55	2 18
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	14	..	58	49	72
‡ Philipsburg, N. J., (46 miles)	70	56	1 00	9	1 14
Elizabethp't, (114 m) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	1 26	1 12	1 68	1 59	1 82
High Bridge, N. J.	1 95	1 75	2 43	2 34	2 52
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	1 89	1 75	2 31	2 22	2 45
Jersey City, N. J., (121 miles) and New York, via L. V. RR.	1 59	1 48	2 01	1 92	2 15

From *Mauch Chunk* to *New York* (121 miles). (towing limits) and Jersey City† via Lehigh Valley RR..... $1 48
From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR 1 25
From *Mauch Chunk* to *Perth Amboy*, tide coal, $1.12, local..... $1 52
From *Penn Haven* to *Perth Amboy*, tide coal..... 1 26
For way points between *Mauch Chunk* and *Phillipsburg*, on the New Jersey Railroads..... 1 00
From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware, Lackawanna and Western RR., Morris and Essex Division..... 65
From *Phillipsburg, N. J.*, to *Newark* (75 m.) via Delaware, Lackawanna and Western RR..... 1 01

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

† Transportation on Coal destined for re-shipment from this point from boat to boat is 20c. less, if discharged upon the wharf 1.c. less than the above rate; if dumped into coal pockets, 10c. additional.

The distances in the above table are Computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 61 miles, and from *Mauch Chunk* it amounts to 106 miles.

Geneva, Ithaca and Sayre Railroad.—The rates of transportation on coal from Coxton, Pa., per ton of 2,240 lb., from and after the first of November, will be as fol lows:

To East Waverly, N. Y..... $1 75
" Ithaca, and for C. Lake RR. (local)..... 1 64
" " for C. Lake RR, and via Erie Canal (shipment) 1 57
To Van Etten, for U. I. and E. RR..... 1 61
"Geneva (local) for S. P. and S. and L. O. S. Railroads, and for N. Y. C. and H. R. RR., except Auburn and Cayuga 2 06
To Geneva, for Buffalo and Towanda..... 1 87
" " " Rochester and Charlotte..... 2 01
" " " Auburn and Cayuga..... 2 50
Total rate to Buffalo..... 3 11
" " " Rochester..... 2 78

REGULATIONS.

A charge of fifteen cents per ton will be collected of each consignee on all coal not unloaded within twenty-four hours after its arrival, and an additional charge of ten cents per ton for every twenty-four thereafter; Sundays and legal holidays excepted.

No allowance will be made for coal lost from cars on account of broken doors or other defects existing when the cars are loaded.

Seventeen cents per ton will be charged, at Ithaca Docks, for shipping Coal direct from cars to vessels, and 12 cents per ton additional from stock, making a total charge on what is shipped from stock of 29 cents per ton.

All freights will be collected weekly, by drafts on shippers, from Coxton to destination.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, March 2, 1877.

American Pig.—The Thomas Iron Company reports 2,000 tons of all grades sold at our quotations. The market is generally very quiet, although there is a feeling, now that the Presidential question is settled, that a better business must soon follow. Low prices, however, are rumored and in some cases not without foundation. We quote No. 1 foundry at $20; No. 2 foundry $19, and forge $18.

Scotch Pig.—We learn of no business except in a small way. We continue to quote: Coltness, $28; Glengarnock, $26 50; Eglinton, $25@25.50.

Rails.—There have been no further sales reported, although there still continues to be a liberal inquiry for steel. The prospects of business in iron rails are very discouraging. We quote steel at mills at $48.50@$50, and iron at $33@$37.

Old Rails.—These appear to be quoted above the views of would-be buyers, and are, as a consequence, very quiet. From the very small demand for re-rolling the future of old iron rails does not look encouraging. We quote at $19@$20.

Scrap.—We quote, without business, No. 1 wrought scrap at $26@$27.

Baltimore, Md. Feb. 28, 1877.

Specially reported by Messrs. R. C. HOFFMAN & Co.

The iron market shows no special change, is moderately active, and prices firm at about quotations:

Baltimore Charcoal	$29@32	Mottled and White	$16@17 00
Virginia Charcoal	28@32	Charcoal C. B. Blooms	60@62 00
Anthracite No. 1	22@23	" " Belletts	65@67 00
" No. 2	20@21	Refined Blooms	50@52 00
Anthracite No. 3	19@20		

Boston, Mass. Feb. 24, 1877.

Pig is rather easy again. It is reported that sales of No. 1 have been made in New York at $19, but that market still quotes nominally $20. We quote $23 50@24 for No. 1, $23 for No. 2 and $22@23 for grey forge. Scotch pig is dull and tends downward, and the small arrivals nearly all go into store. We quote Coltness $28, Glengarnock $26 50, and Eglinton $26. English advices report a dull and inactive market there.

BAR is very quiet, quoting $47@48 for refined and $38@39 for common. In rails the preference continues to run strongly for steel, and iron are dull and neglected. Many mills are now asking $50 at mill for steel, while rails can be had from others at $50, delivered in New York. Iron rails are dull, and may now be quoted $35@38 at mill.—*Commercial Bulletin.*

Buffalo, N. Y. March 1, 1877.

Specially reported by Messrs. PALEN & BURNS, 246 Washington Street.

Consumers are buying only for immediate use. Low prices no inducement to buy any large quantity. Foundries doing fair business.

Prices per Gross ton at Buffalo.

ANTHRACITE.

No. 1 Foundry	$23 50.—4 mos.	
B 1 "	22 00.—4 "	
No. 2 "	21 50.—4 "	
Gray Forge	21 00.—4 "	

LAKE SUPERIOR CHARCOAL IRONS.

No. 1	$26 75.—4 mos
No. 2	25 75.—4 "
No 3	25 25.—4 "
No. 4	25 25.—4 "
No. 5	25 75.—4 "
No. 6	26 25.—4 "

AMERICAN SCOTCH—CHERRY VALLEY.

No. 1	$25 50.—4 mos.
B 1	24 00.—4 "
No. 2	23 00.—4 "

One dollar off for cash.

Chattanooga, Tenn. Feb. 26, 1877.

Specially reported by J. F. JAMES pig iron broker, etc., 233 Market Street.

No change to note in the condition of our market since last report. Demand limited to supply only immediate wants and equal to present production South. No change in prices.

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$20@	22
" " " " No. 2 foundry	19@	20
" " " " gray forge foundry	16@	17
" " " coke, No. 1 foundry	20@	21
" " " " No. 2 foundry	18@	19
" " " " gray forge foundry	16@	17
Charcoal or Coke, White and Mottled	15@	—
Tennessee, Alabama and Georgia cold-blast car wheel	22@	28
Old Rails	18@	19
Old car wheels	16@	17
Wrought Scrap, No. 1	17@	—
" " " 2	12@	—
Cast Scrap	1c@	—
Muck Bar	32@	33

Iron Ores.

Red Hematite (about 55 per cent. metallic iron), f.o.c. et mines	1 25
Brown Hematite (about 25 per cent. metallic iron)	1 75

Cincinnati, Ohio. Feb. 27, 1877.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

CHARCOAL.

Hanging Rock, No. 1 Foundry	$25 00@	—4 mos
" No 2, "	24 00@	—4 mos
" Mill	22 00@22 50	—4 mos
" Soft Silver Gray	21 00@22 00	—4 mos
Tennessee, No. 1, Foundry	23 00@24 00	—4 mos
Tennessee, No. 2, "	22 00@22 50	—4 mos
" Mill	21 00@22 00	—4 mos
Missouri, No. 1, Foundry	@	—4 mos

STONE COAL.

Ohio, No. 1, Foundry	23 00@24 00—4 mos
" No. 2, "	22 00@22 50—4 mos
" Soft Silver Grey	22 00@22 50—4 mos
Ohio Mill	20 50@21 00—4 mos
Missouri, No. 1 Foundry	25 00@ —4 mos
" No. 2, "	23 00@24 00—4 mos
" Mill	22 00@ —4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00—4 mos
Tennessee "	28 00@32 00—4 mos
Missouri "	30 00@33 00—4 mos
Alabama "	28 00@32 00—4 mos

BLOOMS.

Charcoal	55 00@ 65 00—cash

SCRAP IRON.

Cast	50c.@ 85—cash
Wrought	1 00@1 40—cash

Cleveland, Ohio. Feb. 27, 1877.

Specially reported by Messrs. C. E. BINGHAM & Co.

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	26 00@....
No. 2, " " "	25 00@....
No. 1, Anthracite	24 00@....
No. 2, "	23 00@....
No. 1, Bituminous	24 00@ ..
No. 2, "	22 50@....
American Scotch, No. 1, Cherry Valley	25 50@....
" " B—1, " "	24 50@....
" " No. 2, " "	23 00@....
No. 1, Massillon	25 00@....
B—1, "	23 50@....
No. 2, "	21 50@....

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	26 50@....
No. 4 " "	27 00@....
Nos. 5 and 6 "	26 50@....

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	26 00@....

FORGE IRON.

No. 1, Gray	21 00@....
White and Mottled	19 00@....

Louisville, Ky. Feb. 27, 1877.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market continues firm, and without change in either price or tone. The stock of hot blast iron, both at furnace and in yard here, is small, and any considerable demand must necessarily advance prices.

The usual time, four months, allowed on quotations below.

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$24 50@25 50
No. 2 " " "	22 00@23 00
No. 1, Mill, from " "	21 00@ —
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	21 50@22 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	20 50@21 00
No. 1, Mill, from " " " "	20 50@21 00

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	23 00@23 50
No. 2, " " " "	21 00@22 00
No. 1, Mill, " " "	22 00@21 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores	21 00@22 00
No. 2, " " " "	20 50@21 00
No. 1, Mill, " " "	20 00@20 50
No. 1 Foundry, from Missouri Ores	24 00@25 00
No. 2 " " "	23 00@24 50
No. 1 Mill, from Missouri Ores	23 00@24 50

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@40 00
" " Tennessee "	26 00@28 00
" " Alabama and Georgia Ores	28 00@35 00
" " Kentucky Ores	28 00@40 00

Milwaukee, Wis. Feb. 27, 1877.

Specially reported by Messrs. R. P. ELMORE & Co.

Lake Superior No. 1 Charcoal	$26 00
" " " 2	25 00
Lake Superior No. 1 Anthracite	25 00
" " " 2 "	24 00

Philadelphia, Pa.

(Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, JR., & CO., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending March 1, 1877.)

PIG IRON.—There is little to say this week; the sales go on in a small way, more small buyers coming in the market this week for iron than for some months. This is considered a good sign as showing there must be some work, as that class never buy except when their needs push them into the market. The large buyers are not buying, either they are full or waiting to see how the political trouble is to be settled before they again go in. We report sales of about 3,000 tons all grades and brands, and quote No. 1, $20 to $21; No. 2, $18.50 to $19.50; gray forge, $17.50 to $20 as to brand.

MANUFACTURED IRON.—The demand for bars continues as for some weeks in a hand-to-mouth policy, keeping most of the mills moderately busy. There is a sale of 1,000 tons ship plating reported this week, terms, etc., withheld for the present, but said to be at an astonishing low price. The demand for tank iron has again fallen off and few orders for skelp are coming on the market. We quote bars 2·1 to 2·2 cents per lb.; plate and tank iron, 2⅞ to 7 cents per lb.; skelp, 2¼ to 2½ cents per lb.

RAILS.—All the steel rail mills are buying, and some orders are coming on the market at advanced prices. New rails continue dull of sales at low prices. We quote steel, $49 to $51; iron, $36 to $40 at mill.

OLD RAILS.—We quote $20 to $22.

SCRAP.—Wrought is quoted $22 to $26; cast, $14 to $19.

OLD WHEELS, $19.20 to $20.

Pittsburg, Pa. Feb. 27, 1877.

Specially reported by A. H. CHILDS.

This market has developed no new features during the past week. The volume of trade is not very large, but prices are well sustained and the best brands are held firmly at full rates. Quotations unchanged.

No. 1 Foundry	23 00@24—4 mos
" 2 "	22 00@23 "
Gray Forge	20 00@22 "
White and Mottled	18 00@19 "
Warm blast Charcoal	23 00@29 "
Cold blast Charcoal Western	40 00@45 "

St. Louis, Mo. Feb. 27, 1877.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market is still improving though prices remain about the same, except on a few brands there has been a slight raise. We quote same as last.

CHARCOAL.

Missouri No. 1 Found'y.	$23@25
" " 2 "	22@23
" Gray Mill	22@23
H. Rock No. 1 Found'y.	25@26
" " " 2 "	23½@24
" " Gray Mill	23@24
Tenn. No. 1 Foundry	23½@24
" " 2 "	22½@23
" Gray Mill	22½@23

COKE.

Alice H. R. Ex No. 1 F'y.	26 50
" " " 1 "	25 50
B, " 1 "	24 50
" " 2 "	23 50
Forge	23 50
Chat., Tenn. No. 1 Fd'y.	25 00
" " " 2 "	23 50
" " Forge	22 50
" " White Mtl'd	21 00

STONE COAL.

Missouri No. 1 Fd'ry.	25@24
" " 2 "	23@23
" Gray Mill	22@26
" White & Mt'd	21@22

COLD BLAST CHARCOAL FOR CAR WHEELS.

All Numbers.

Hanging Rock	35@46
Tennessee	30@33
Kentucky	30@33
Missouri	28@30
Georgia	28@30
Alabama	28@30
Assorted Bar Iron $2 25, rates.	
No. 1 Wrought Scrap 950. cwt.	
Heavy cast " 70 "	
Light " 40 "	

Montreal, Canada. Feb. 20, 1877.

We quote: Pig Iron.—Garsherrie, $22.50@23 00; Summerlee $22.00@22.50; Eglinton $20.75@20.75; Hematite $26.00@27.00. Bar, per 100 lbs., Scotch and Staffordshire $2.00@2.10; best do., $2.20@2.30, Swedes and Norway $4.75@$5.50; Lowmoor and Bowling, $6@6.50.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Mar. 2, 1877.

No improvement in actual business has taken place, although there is a much better feeling which has been brought about by the settlement of the Presidential question, and some dealers announce a large number of inquiries.

Gold Coin.—During the week under review the price of gold has ranged from 105⅞ to 104¼, and closed at 104¾.

Bullion.—Silver has been a little higher since Wednesday, when the award of India bills was made at an

advance of ⅛d. per rupee. The future of the market will turn on the India exchange, lately unexpectedly weak, and on possible legislation before the expiration of the present congress on the proposed issue of silver coins to the extent of $80,000,000, although it is very improbable that any such authorization will be made. The quotations to-day are, in London, 56⅛@56¼d.; in this city, 121¾@122; and in San Francisco, 4⅛ per cent. discount.

Copper.—From 200,00c to 300,000 lb of copper are reported to have been sold at from 18¾@19c., although sales at less than 19c. are difficult of confirmation. Further sales amounting to about 200,000 lb., have been made at prices ranging from 19c. to 19¼c. 19¼ is freely bid, while 19⅜@19½ is now asked, with a large amount of copper held at 20c. The market is much more firm and settled than a week ago, the weak speculators having mostly sold out. The latest advices from London quote Chili Bars at £71, and Best Selected, £78.

Tin.—Straits in London is quoted at £73 10/ while a telegram from Singapore to-day quotes at $21 per picul, and says that there is trouble in the mining districts, at Junk Ceylon, cutting off the supply of tin. There are no quotations being made at Penang. There has been a fair business in a jobbing way, in this market. We quote, in gold, per lb., as follows: Straits, 17c.; L. & F., 16⅝c.; Refined, 16¾c; and Banca, 19¼@19½.

Tin Plates.—We note sales of 1000 boxes assorted charcoal plates on private terms. There has been a very liberal business in a jobbing way, and considerable inquiries are reported. We quote, in gold, per box, as follows: charcoal tins, $6.75@$7; and ternes, $6@$6.25; coke tins, $6; and ternes, $5.50@$5.75.

Lead.—A Western operator has purchased 1,000 tons of various brands—100 tons at 6·30c. and the balance from 6·40c.@6·50c., after which it became impossible to secure further lots at less than 6·75c. which is the price to-day. The object of these purchases appears to have been to advance prices here, with the expectation of bringing about a corresponding advance in the West. The San Francisco *Commercial Herald* of February 22, says: "The ship *Mary Whitridge*, for Hongkong, carried 426,700 lb. of pig lead, and the *City of San Francisco, en route* for New York carried 670,972 lb." Previous to the above mentioned shipment to China, we have noted several small lots, aggregating about 150 tons. If we are to do a regular business in lead with China it should have considerable influence on the Eastern markets by reducing our supplies. China now purchases several thousand tons per annum from Europe.

Spelter and Zinc.—Domestic spelter is quiet at 6¼c.@6⅝c. currency. Sheet zinc is still quoted at 7½c.@7¾c. currency for domestic.

Antimony is quoted at 12¾c.@13c.

Quicksilver.—This article is quoted in London at £7 10/ per flask, and in San Francisco at 43¼c.@44c. gold, per lb. In this market there is no regular quotation.

The San Francisco *Commercial Herald* of Feb. 22, says of Quicksilver: As stated in our last, the *Belgic* for Hongkong carried a very large quantity, say 3,572 flasks. This, we are told, was secured at all sorts of prices, running from 42½@43c. up to 44@45c. The impression prevails here that at these low prices the Chinese are hoarding stocks, believing it to be a good permanent investment, somewhat after their manner of hoarding silver by burying it in the ground. At the close small lots are being taken at 44c. but this price at date is an extreme figure.

THE SALT LAKE CITY ORE & METAL MARKET.

Telegraphic advices from Salt Lake City, dated Mar. 2, 1877, give the following prices for base bullion, and argentiferous lead ores:

Argentiferous Lead (Base Bullion) —$73¼ per ton for lead. $1.22½ per ounce for silver. $20 per ounce for gold. The quotation for silver is based upon the silver contents in the lead of 70 ounces per ton of 2,000 lb.

Other bullion sold at 124 per ounce for silver, and 73¾ for lead.

A correspondent of the *Inter-Ocean*, under date of the 21st ult., says:

"The shipments of ore and bullion for the two weeks ending Feb. 17 are as follows: 46 cars bullion to Omaha, 13 cars bullion to New York, 20 cars bullion to Pittsburg, 24 cars bullion to St. Louis, 45 cars lead ore to Hilliard, 37 cars lead ore to Pittsburg, 1 car copper ore to Baltimore, 5 cars copper ore to Pennsylvania. Total bullion, 2,045,967 lb.; total copper ore, 539,860 lb.; total lead ore, 177,363 lb.: total of all kinds, 4,303,180 lb. I think the London operators are endeavoring to bear the market to influence Congress on the silver bill."

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, March 2, 1877.

The coal stocks still attract great attention, and as a rule they have bravely held their own against the attacks of the bears during the week.

Delaware & Hudson has fluctuated from 46⅛ to 50⅜ with transactions amounting to over 36,000 shares, the majority at 48 to 49.

Delaware, Lackawanna & Western has been held up well between 60¼ to 64¼ with very heavy transactions aggregating over 136,000 shares. It is rumored that this company is negotiating for the purchase of the Cayuga Lake Railroad.

New Jersey Central is so near nothing it has little chance to fluctuate, but it has managed to fall from about 11 at the beginning of the week to 9¼ to-day.

The locomotive engineers of this road object to the weekly payment of wages proposed by the receiver on the ground that the agreement made with the company after the recent strike provided for monthly payments, and they fear that if one clause of the agreement is altered others may be. They will therefore decline to receive pay otherwise than monthly as provided. A general law is now pending in the New Jersey Legislature, and will probably pass. It is intended to cover the case of this road and other similar cases, and to authorize the payment of arrears of wages from the earnings of the road under the receiver.

Consolidation Coal Company.—About 600 shares of this stock have sold during the week between 31 and 33¼, the final sales being made at the higher figure.

Chesapeake & Ohio Railroad.—The Governor of Virginia has addressed a message to the Legislature calling attention to the interest of the State in this in view of the approaching foreclosure. He claims that the company has not complied with the contract under which the State transferred to it the Covington & Ohio road. He intimates that there has been mismanagement and extravagance, and suggests a legislative inquiry into the facts. He reports also that he has appointed counsel to represent the State in the foreclosure suit. A number of suits have begun in Louisville to recover on notes given by the company to the Ohio Falls Car Company in 1873, and now held by various parties. They amount in all to about $250,000, and are secured by the pledge of bonds of the company to the nominal amount of $350,000.

The Lehigh & Wilkes-Barre Coal Company—did not pay its interest due on the 21st inst. The condition of the bond account of the company under the $15 000,000 mortgage is as follows:

Bonds reserved to cover issue under the $10,000,000 mortgage (called sterling loan) outstanding.....	$1,681,000
Bonds reserved to cover prior liens.	1,716,400
Bonds issued	11,500,000
	$14,897,400

This does not include the purchase money mortgages which, it is understood, amount to nearly $1,000,000 more, and which constituted a lien on the property before the $15 000,000 mortgage was made.

COUPONS AND INTEREST are due on the bonds of the following companies during the present month:

Alexandria Canal Railroad and Bridge.—Coupons.

American Coal Company of Maryland.—Coupons.

Baltimore and Ohio Railroad Company.—Coupons of sterling loan.

Cameron Coal Company.—Coupons.

Cleveland and Mahoning Valley Railroad Company.—Coupons of the third mortgage bonds will be due on the 15th inst.

Consolidation Coal Company.—Coupons of the first mortgage bonds of the Cumberland and Pennsylvania Railroad Company.

Delaware, Lackawanna and Western Railroad Company.—Coupons of the second mortgage bonds and Lackawanna and Bloomsburg first mortgage extension bonds.

Himrod Furnace Company.—Coupons.

Illinois and Missouri Coal Company.—Interest.

Kemble Coal and Iron Company.—Coupons.

Lackawanna and Bloomsburg Railroad Company.—Coupons of the first mortgage extension bonds paid by the Delaware, Lackawanna and Western Railroad Company.

New Boston Coal Mining Company.—Coupons.

Rome, Watertown and Ogdensburg Railroad Company.—Coupons of the Watertown and Rome Railroad Company's bonds.

Schenectady and Duanesburgh Railroad Company.—Coupons paid by Delaware and Hudson Canal Company.

Spur Mountain Iron Mining Company—Coupons.

Steubenville and Indiana Railroad Company.—Coupons of the first mortgage bonds, paid by United Railroads of New Jersey.

Union Iron Company of Buffalo, N. Y.—Coupons.

Warren Railroad Company.—Coupons of the convertible bonds paid by Delaware, Lackawanna and Western Railroad Company.

Wheeling Iron and Nail Works Company.—Coupons.

St. Louis, Iron Mountain and Southern Railroad Company.—This Company will hold an election for directors on the 6th inst.

Pennsylvania Coal Company.—We note an auction sale of 15 shares of this stock during the week at $196 per share.

Miscellaneous Sales and Quotations.

Sales and quotations of the stocks and bonds dealt in here and at Philadelphia, for the week ending the 2d inst., are given in the following tables. The Philadelphia quotations will have a * affixed.

STOCKS.

	Quotations.—High.	Low- est.	Clos- ing.	Sales Shares.
*Cambria Iron Co.....	—	—	60	—
*Pennsylvania Salt Manuf. Co.	—	—	62	—
*Westmoreland Coal Co.....	82	—	—	—
*Buck Mountain Coal Co.....	—	—	—	—
St. Louis, J. M. & S.....	—	—	10	—
BONDS.				
D., L & W. 7s, Convt., 1892.....	102	102	—	$13,000
" " 2d mtge., 1881.....	108	108	104½	1,000
N. J. C., 1st mtge., new.....	106	104½	104⅝	37,000
" " 1st mtge., cons.....	63¼	62½	61	103,000
" " Convt.....	55	52	52	34,000
L. & W.-B. Coal Co., cons.....	35	32¼	34¼	12,000
Am. Dock & Imp. 7s.....	45	45	44	1,000
D. & H. C. Co., 1st m., 1884.....	92	90	93	6,000
" " " " reg., 1891.....	94	93	93	33,000
" " " " 7s, 1877.....	—	—	93½	—
" " " " reg. & con., 1894..	83¼	82	84	19,000
St. L. I. M. & S., 1st mtge.....	98¾	95¼	98	26,000
Ches. & Ohio, 1st mtge.....	22	22	—	2,000
*L. V. RR., con. mtge., 6s, 1923.	96	95¾	95¾	15,000
" " 2d mtge., 7s, 1910..	109	109	108	1,000
" " reg. & con., 1898...	106	106	106	1,000
" " 1s mtge., 6s	107	107	—	1,000
*P. RR., 1st mtge., 1820	104¾	104	104½	5,000
" Gen. mtge. coup. 1910...	107	107	107	8,000
" Con. m. 6s. con. & reg. 1905.	—	—	—	—
*P. & R. RR. 7s, 1893	107	106	105	13,000
" " con. m. 7s. con. 1911.	93	92	92	4,000
" " Deb. 6s, 1893	32	32	31	3,000
" " New convt. 7s	45	45	45	4,000
" " Con. mtge. 7s reg...	93	93	92	9,000
*P. & R. C. & I. Co. Deb. 7s....	—	—	30	—
*L. C. & N. Co. 6s. 1834.....	101	100½	100	1,150
" " RR. loan, '97.....	100	100	100	19,300
" " Convt. gold, 1897.	87¾	86	87	10,000

Total transactions for the week $381,450

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, March 2, 1877.

A better feeling is noticeable in the prices and dealings in the coal shares on this market during the week. The quotations generally close at very near the highest point of the week.

The Pennsylvania Railroad.—The extreme prices of this stock for the week have been 83 and 86¾ and the closing quotation of 85¾, an advance equal to 1¼ per ent. The sales amount to nearly 94,000 shares. The quarterly dividend of this Company, now in course of payment, requires $1,377,404, or equal to $5,509,616 for the four quarters of the year.

Lehigh Coal and Navigation Company.—This stock closes strong at an advance equal to ¼ per cent. the sales aggregate about 29,000 shares. The annual report of this Company was read at the meeting held on the 27th ult., we will refer to this at another time and give extracts.

Philadelphia and Reading Railroad.—About 23,000 shares of this stock have changed hands during the week at from 22¾ to 24¾ per cent. closing at 25½.

COUPONS AND INTEREST are due on the bonds of the following companies during the present month:

Connection Railroad Companies.—Coupons of the first bonds are due and payable by the Pennsylvania Railroad Company on the 15th inst.

East Pennsylvania Railroad Company.—Coupons of the first mortgage bonds paid by Philadelphia and Reading Railroad Company.

Lehigh Coal and Navigation Company.—Coupons of the convertible bonds.

Lehigh Valley Railroad Company.—Interest on the 7 per cent. bonds.

New Jersey United Railroads.—Interest, paid in gold, on loan of 1901.

Pennsylvania Railroad Company.—Interest on the consolidated mortgage registered bonds.

Philadelphia and Reading Railroad Company.—Coupons of the first mortgage bonds of the East Pennsylvania Railroad Company.

Reading and Columbia Railroad Company.—Coupons of the first mortgage bonds.

Schuylkill Navigation Company.—Interest on the first mortgage bonds.

United New Jersey Railroad and Canal Company.—Interest on loan of 1901.

Barclay Railroad Company.—This company will pay a dividend during the present month.

Philadelphia and Reading Coal and Iron Company.—Interest on the 7 per cent. debenture bonds and also on the 7 per cent. common bonds.

Locust Mountain Coal Company.—The dividend period of this Company will occur during the present month.

Andover Iron Company.—The annual meeting of this Company will be held on the 13th inst.

AUCTION SALES OF STOCKS AND BONDS during the week have been as follows:

Mill Creek and Mine Hill Navigation and Railroad Company.—20 shares at $25½ per share.

Catawissa Railroad Company.—$6,000 new 7 per cent. bonds at 90⅛ per cent.

Schuylkill Navigation Company.—$2,000 6 per cent convertible mortgage loan at 50 per cent.

Westmoreland Coal Company.—40 shares at $82, per share.

Union Canal Company.—500 shares preferred stock at 01.

Barclay Coal Company.—This company will hold a special meeting on the 12th of April next for the purpose of voting upon a resolution to increase the indebtedness of the company.

COAL TRANSPORTATION AND MINING STOCKS.

(New York and Philadelphia.)

	Amount of Cap. Stock.	Shares issued.	Date, percentage and amount of last dividend.		QUOTATIONS *g*												SHARES SOLD.
					Sat.		Mon.		Tues.		Wed.		Thurs.		Fri.		
					H'gst.	L'st.	H'gst.	L'st.	H'gst.	L'st.	H'gst.	L'st.	H'gst.	L'st.	H'gst.	L'st.	Cl'g. Bid.	
Consolidation Coal Co	$10,250,000	102,500	Dec. 6, '76, 2½	$256,250	32½	31	....	....	32½	32	33	....	33	....	33½	33½	33¼	600
Delaware and Hudson Canal Co	20,000,000	200,000	Aug. 1, '76, 4	800,000	48¾	46¼	48	46¼	49	46¼	50½	48	49½	48	50	48¼	48	36,451
Delaware, Lackawanna and W. RR. Co.	25,889,000	519,780 *c*	April 20, '76, 2½	647,230	62⅝	60½	62	60¼	62⅝	61⅜	64⅛	61¾	64	62½	64⅛	62¼	62⅝	136,137
Lehigh Coal and Navigation Co	10,448,550	208,971 *c*	June 3, '76, 1½	204,971	40	38	40	38	39¾	38	40¾	40	41¾	40½	....	....	44½	28,814
Lehigh Valley RR. Co	27,042,900	540,858 *c*	Jan. 15, '77, 2	540,858	86½	86	87	86½	87	86½	87	86	88	87½	....	....	87½	2,693
Maryland Coal Co	4,400,000	44,000	Jan. 31, '76, 2	66,000	....	....	....	....	....	....	....	....	....	....	....	....	9	.....
New Jersey Central RR. Co	20,000,000	200,000	Jan. 21, '76, 2½	500,000	11⅛	10¼	10¾	10¼	11	10¼	11	10½	10⅝	9	10	9¼	9¼	16,295
Pennsylvania Coal Co	5,000,000	100,000 *c*	Feb. 1., '77, 5	250,000	*200	....	*199½	....	*210	196	*200	....	....	....	....	....	....	.....
Pennsylvania RR. Co	68,868,700	1,377,404 *c*	Nov. 26, '76, 2	1,377,374	84¾	83	84½	83½	86	84½	86¾	85	86	84	....	....	85¾	93,477
Philadelphia and Reading RR. Co	34,277,575	685,551 *c*	Jan. 18, '76, 2½	†856,9511	23½	22¾	23¾	22¾	23½	23	23¾	23¼	24¾	24	....	....	25½	22,897

Total sales for the week.....336,764

MINING STOCKS,

New York.

Name of Company.	Location.	Feet on Vein.	Capital Stock.	*a* No. of Shares.	Total Assessments Levied.	Date and Amount of Last Assessment per share.	Total Dividends paid.	Date and Amount of Last Dividend per share.	These quotations are in currency, and in the absence of final bid prices are based on the latest sales as they occur during the operations of each day.						
									Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	
Alpha Cons *G. S.*	Nevada,	300	$ 3,000,000	30,000	$180,000	Aug. 12, '75, $1.	....	.....	$21 37½	$21 62½	$21 62½	$22 25	$21 00	$21 37½	2,800
Belcher, *G. S.*	Nevada,	1,040	10,400,000	104,000	660,400	April 14, '71, $4.	$15,397,200	April 10, '76, $1.	9 75	10 00	10 00	9 75	9 37½	8 87½	1,600
Bertha Gold Co	Virgi'a.	645 acs.	300,000	30,000	**	.....	....	.....	10 62½	10 62½	10 87½	11 00	11 00	10 50	3,450
Best and Belcher, *G. S.*	Nevada,	545	10,080 000	100,800	236,992	Feb. 6, '77, $1	....	.....	35 62½	37 00	37 12½	36 87½	....	35 37½	1,500
Bullion, *G S*	Nevada,	913⅛	10,000,000	100,000	2,202,000	Jan. 15, '77, $1.50.	....	.....	18 37½	19 00	19 00	....	19 62½	19 00	1,200
Caledonia, *G. S.*	Nevada,	2,188	10,000,000	100,000	1,310,000	Feb. 10, '77, $1.	....	.....	....	9 75	....	....	....	....	400
California, *G. S.*	Nevada,	600	54,000,000	540,000	....	.....	10,800,000	Feb. 15, '77, $2.	....	50 62½	50 62½	50 00	51 75	52 50	1,730
Centennial, *G.*	Califor.	66 acres	1,000,000	100,000*b*	....	.....	....	.....	....	....	....	....	....	....	....
Cholar Potosi, *G. S.*	Nevada,	1,400	2,800,000	28,000	1,282,000	June 26, '76, $5.	3,080,000	Feb. 10, '72, $1.	71 50	70 75	67 75	69 50	69 87½	70 00	1,250
Cleveland, *G.*	Colo.	3,715	250,000	25,000*b*	**	.....	....	.....	10 62½	10 75	10 75	11 00	11 00	11 00	3,750
Cons. Hercules & Roe, *S*	Colo.	16,500	1,000,000	100,000	**	.....	120,000	.....	....	....	....	....	....	....	.....
Cons. Imperial, *G.S*	Nevada,	468	50,000,000	500,000	125 000	July 25, '76, 25*c.*	....	.....	2 37½	2 37½	2 37½	2 37½	2 50	2 37½	2,150
Con. N. Slope & E.C.T.	Colo.	15,000	500,000	10,000	**	.....	....	.....	....	17 25	17 50	....	10 25	....	900
Cons. Virginia, *G. S.*	Nevada,	710	54,000,000	540,000	411,200	June 11, '73. $3.	25,920,000	Dec. 11, '76, $2.	....	52 75	52 50	51 75	....	52 00	1,140
Confidence, *G. S*	Nevada,	130	2,496,000	24,960	1,283,840	March 18, '73, $1.	78,000	May 1, '65, $8.33⅓	....	....	....	9 00	....	8 25	300
Crown Point, *G. S.*	Nevada,	600	10,000,000	100,000	1,273,370	Jan. 10, '77, $1.	11,588,000	Jan. 12, '75, $2.	....	11 00	11 00	9 87½	10 50	10 00	2,750
Douglas Mining Co	Colo.	21,000	1,000,000	10,000	**	.....	....	.....	....	....	....	....	....	....	.....
Eureka Cons. *G. S. L.*	Nevada,	..	5,000,000	50,000	100,000	May 26, '76, $1.	1,000,000	Aug. 5, '75. $1.	20 87½	21 25	21 25	21 00	20 87½	....	1,870
Exchequer, *G. S.*	Nevada,	400	10,000,000	100,000	280,000	Sept. 23, '76, $1.	....	.....	....	7 00	7 00	....	....	6 87½	6 0
Gould and Curry, *G. S.*	Nevada,	621	10,800,000	108,000	2,134,000	Jan. 23, '77, $1.	3,934,800	Oct. 10, '70, $10.	....	14 12½	14 12½	14 25	14 12½	14 25	1,200
Grant, *G. S.*	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Granville Gold Co	N. Car.	9,000	1,000,000	100,000	**	.....	....	.....	2 75	2 62½	2 62½	2 87½	2 87½	2 75	3,450
Hale & Norcross, *G. S.*	Nevada,	400	11,200,000	112,000	2,354,000	Jan. 22, '77, $1.	1,598,000	April 10, '71, $5.	6 37½	6 50	....	....	6 50	6 25	1,200
Henry Tunnel Co	Nevada,	3,000	2 000,000	80,000	**	.....	....	.....	19 12½	19 00	19 12½	19 25	19 25	....	1,600
Hukill, *S.*	Colo.	3,288	1,000,000	10,000	**	.....	20,000	Nov. 1, '76, $1	....	....	....	....	....	....	.....
Indian Queen, *S.*	Nevada,	1,000	3 000,000	60,000	....	.....	60,000	.....	....	....	....	....	....	....	.....
Julia Cons. *G. S.*	Nevada,	3,000	11,000,000	110,000	220,000	Jan. 4, '77, $1.	....	.....	6 25	5 75	6 00	5 87½	5 87½	....	1,700
Justice, *G. S*	Nevada,	2,100	10,500,000	105,000	1,502,500	Sept. 14, '76, $5.	....	.....	14 00	14 37½	14 37½	14 62½	14 25	14 50	1,900
Kentuck, *G.S.*	Nevada,	95	3,000,000	30,000	270,000	Dec. 3, '74, $1.	1,252,000	March 8, '70, $5.	8 00	8 00	8 00	....	7 62½	....	820
Kossuth, *G.S.*	Nevada,	2,700	5,400,000	108,000*c*	405,000	Aug. 15, '76, 50*c.*	....	.....	....	....	....	....	....	....	.....
Leopard, *G. S.*	Nevada,	1,500	5,000,000	50,000	1,354,000	March 31, '76, $1.	162,500	Dec. 15, '76, 50*c.*	6 00	5 87½	5 87½	....	5 50	5 37½	700
Lucerne Mining Co	Colo.	4,200	5,000,000	500,000	**	.....	....	.....	1 87½	1 87½	1 75	1 87½	1 87½	1 62½	2,700
‡Mari. L. & M. Co., pre.	Cal.	44387 ac	5,000,000	50,000	1,350,000	Feb. 17, '77, $1.	....	.....	....	....	6 12½	7 00	7 12½	7 00	600
" " " com.	"	"	10,000,000	100,000	1,3 0,000	Feb. 17, '77, $1.	....	.....	....	....	6 00	6 37½	6 12½	6 37½	2,000
Mer. and Min. Tun. Co.	Colo.	30,000	500,000	50,000	**	.....	....	.....	....	....	....	....	....	....	.....
Merrimac, *S.*	Mass.	1,500	500,000	50,000*b*	**	.....	50,000	March 10, '77, 10*c.*	6 00	6 75	6 62½	6 75	6 87½	6 62½	4,625
Mexican, *G. S.*	Nevada,	600	10,080,000	100,800	100,800	Sept. 5, '76, 50*c.*	....	.....	....	18 75	20 00	....	19 75	20 50	1,300
Morning Star	Nevada,	1,600	8,000,000	80,000	....	.....	....	.....	....	....	....	....	....	....	.....
Northern Belle, *S.*	Nevada,	1,600	5,000,000	50,000	....	.....	1,050,000	Feb. 15, '77, $1.	28 12½	30 00	30 00	....	29 87½	28 50	1,100
Ophir, *G. S.*	Nevada,	675	10,080,000	100,800	2,034,400	May 14, '75, $2.	1,394,400	March 9, '04, $4.	23 87½	27 50	28 50	28 50	27 12½	...	1,500
Original Comstock, *G.S.*	Nevada,	....	10,000,000	10 000*b*	5,000	Feb. 5, '77.	....	.....	....	....	....	....	....	....	.....
Overman, *G. S.*	Nevada,	1,200	3,840,000	38,400*b*	2,222,280	Oct. 21, '76, $3.	....	.....	93 00	94 12½	94 12½	....	92 62½	....	1,375
Pleasant View	Colo.	1,200	200,000	20,000	**	.....	....	.....	....	....	....	....	....	....	.....
‡Quicksilv. M.Co., pre.	Cal.	8500 acs.	1,2 1,3 00	100,000	....	.....	....	.....	19 50	....	19 00	21 00	....	....	400
" " " com.	"	"	5,703, 7 00	"	....	.....	....	.....	13 00	12 25	....	....	14 00	14 50	200
Raymond and Ely, *G. S.*	Nevada,	5,000	3,000,000	30,000	540,000	Dec. 5, '76, $1.	3,075,000	Sept. 10, '73, $3.	6 37½	6 25	6 37½	6 37½	5 87½	6 37½	2,200
St. Joseph Lead Co	Missou.	2600 acs.	1,000,000	100,000	....	.....	210,000	.....	....	....	6 50	6 50	....	6 50	400
Santiago, *G. S.*	Nevada,	2,000	11,200,000	112,000	....	.....	....	.....	....	....	....	....	....	....	.....
Savage, *G.S.*	Nevada,	800	11,200,000	112,000	2,970,000	Jan. 27, '77, $1.	4,460,000	June 11, '69, $3.	7 62½	7 50	....	....	....	....	300
Seaton	Colo.	1,700	500,000	50,000	....	.....	....	.....	2 50	3 00	3 25	3 37½	3 75	4 00	19,450
Sew. Belcher, *G.S.*	Nevada,	160	640,000	6,400	244,800	April 11, '76, $5.	....	.....	63 62½	63 62½	63 50	....	63 87½	....	1,0 0
Sierra Nevada, *G. S.*	Nevada,	3,650	10,000,000	100,000	1,500,000	Oct. 24, '76, $1.	102,500	Jan. 16, '71, $1.	7 75	....	....	....	8 00	....	700
Silver City, *G. S.*	Nevada,	3,900	6,310,000	63,100	15,775	Nov. 16, '76, 25*c.*	....	.....	....	....	....	....	....	....	.....
Silver Hill, *G. S*	Nevada,	5,400	10,800,000	108,000	864,000	Feb. 6, '77, $1.	....	.....	5 37½	6 00	6 00	....	6 50	....	1,370
South Comstock, *G. S.*	Nevada,	1,500	10,000,000	100,000	54,000	Jan. 30, '77, 25*c.*	....	.....	....	....	....	....	....	....	.....
South. California, *G. S*	Nevada,	1,500	5,000,000	50,000	....	.....	....	.....	....	....	....	....	....	....	.....
Southern Star, *G. S.*	Nevada,	1,500	6,000,000	600,000	....	.....	....	.....	75	75	1 00	....	....	....	450
Treuton, *G. S.*	Nevada,	..	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Union Cons. *G. S.*	Nevada,	850	10,000,000	100,000	260,000	March 3, '76, $1.	....	.....	9 50	10 00	9 87½	....	9 62½	....	1 400
West Belcher, *G. S.*	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Yellow Jacket, *G. S.*	Nevada,	1,200	12,000,000	120,000	2,718,000	Oct. 28, '76, $1.	2,184,000	Aug. 10, '71, $2.50.	15 50	14 75	15 00	14 50	14 37½	....	2 400
Young America, *S.*	Nevada,	1,000	3,000,000	30,000	6,000	Oct. 23, '76, 20*c.*	....	.....	....	....	....	....	....	....	.....
Total Assessments levied to date, $31,475,367					Div'ds pd. to date, $87,536,400								Total sales.....85,[illegible]		

Boston.

									Fri.	Sat.	Mon.	Tues.	Wed.	Thurs.	
Allouez, *C.*	Mich.	..	$1,000,000	20 000 *c*	$940,020	May 9, '76, $5.	....	.....	$5 25	5 12½	5 00	5 25	5 00	5 00	.....
Calumet and Hecla, *C.*	Mich.	2¾ mile	2,000,000	80,000*d i*	1,200,000		$11,450,000	Feb. 15, '77, $5.	182 50	181 50	179 25	177 75	178 00	178 00	.....
Central, *C.*	Mich.	..	500,000	20,000 *c*	100,000	June, '62, 65*c.*	1,160,000	Feb. 6, '77, $7.	32 50	33 00	33 25	34 00	33 50	33 00	.....
Copper Falls, *C.*	Mich.	..	1,000,000	20,000*d*	535,000	May 10, '76,	100,000	Nov., '71, $1.	3 50	3 50	3 62½	3 50	3 62½	3 62½	.....
Dana, *C*	Mich.	..	500,000	20,000*d*	68,000	Jan., '73, 50*c.*	....	.....	10	10	10	10	10	10	.....
Dawson, *S.*	Canada.	..	1,200,000	60,000*f*	....	.....	....	.....	14	13	12½	13	13	13	.....
Duncan, *S.*	Canada.	..	1,200,000	60,000*f*	75,000	July, '76, 41⅔.	....	.....	5 93¾	6 75	6 12½	5 87½	5 87½	6 00	.....
Franklin, *C.*	Mich.	..	500,000	20,000*d*	360,000	June, '68, $5.	585,000	Nov., '71, $1.	12 87½	12 62½	12 50	12 25	12 00	11 00	.....
Humboldt, *C.*	Mich.	..	500,000	20,000*d*	100,000	Sept. 28, '76, 15*c.*	....	.....	....	20	20	20	20	20	.....
International, *S.*	Canada.	..	1,200,000	60,000*f*	....	.....	....	.....	50	50	50	50	50	50	.....
Madison, *C.*	Mich.	..	500,000	20,000*d*	123,000	Sept. 11, '74, 10*c.*	....	.....	25	25	25	25	25	25	.....
Mesnard, *C.*	Mich.	..	500,000	20,000*d*	160,000	April 12, '65, 50*c.*	....	.....	45	43	40	40	40	40	.....
Minesota, *C.*	Mich.	..	1,000,000	20,000*d*	436,000	June 10, '69, $1.	1,820,000	Mch. 15, '76, 50*c.*	1 37½	1 25	1 25	1 25	1 25	1 25	.....
National, *C.*	Mich.	..	500,000	20,000*e*	195,000	Oct., '75, $1.	360,000	Oct., '73, $1.	1 25	1 25	1 25	1 12½	1 12½	1 12½	.....
Osceola, *C*	Mich.	..	1,000,000	40,000*d*	880,000	May 1, '76, $2.	....	.....	23 00	23 00	22 00	20 00	20 00	22 00	.....
Petherick, *C*	Mich.	..	500,000	20,000*d*	165,533	March 22, '76, 50*c.*	....	.....	37½	37½	40	37	30	20	.....
Pewabic, *C.*	Mich.	..	500,000	20,000*d*	185,000	June, '68, $3.	460,000	July, '73, $1.	3 00	3 25	3 25	3 37½	3 50	4 25	.....
Phœnix, *C.*	Mich.	..	1,000,000	20,000*d*	817,500	Sept., '70, $3.	20,000	Jan. 20, '76, $1.	....	....	....	....	....	....	.....
Quincy, *C.*	Mich.	..	*h* 200,000	20,000*b*	....	.....	2,130,000	Feb. 15, '77, $4.	41 00	40 50	41 50	41 75	41 75	41 50	.....
Ridge, *C.*	Mich.	..	500,000	20,000*d*	200,000	.... ..	90,000	Feb. 8, '75, $1.	4 50	4 50	4 37½	4 37½	4 37½	4 37½	.....
Rockland, *C*	Mich.	..	500,000	20,000*d*	495,000	Jan., '74, $1.	....	.....	25	25	25	25	25	25	.....
Star, *C.*	Mich.	..	500,000	20,000*d*	265,000	March 30, '76, 50*c.*	....	.....	27	27	25	25	25	25	.....
Superior *C.*	Mich.	..	500,000	20,000*d*	340,000	March, '74, 25*c.*	....	.....	10	10	10	10	10	10	.....
Total Assessments levied to date, $7,640,033					Div'ds paid to date, $18,175,000								Total sales ..... —— shares		

G. Gold. S. Silver. L. Lead. C Copper. *a* The par value of shares is $100, unless otherwise designated. *b* Par value $10. *c* Par value $50. *d* Par value $25 each. *e* Par value $15. *f* Par value $20. *g* Quotations represent the latest prices bid. Prices asked will have a * affixed. For readines of comparison the quotations of Philadelphia Stocks and the shares being $50 each, are based upon a percentage value, or 100, equal to shares of $100. *h* Full paid. *i* On the four old companies. † This company declared a dividend of 3½ per cent. on its preferred stock in July, 1876. ‡ New York Stock Exchange quotations.

ADVERTISERS' INDEX.

Page.

Assaying Tools and Chemicals:
Benjamin, E. B., New York v

Blasting Powder:
Laflin & Rand Powder Co., New York .. vi
Miners' Supply Co. (Blasting Squibs), St. Clair, Pa. i
Oliver, Paul A., Wilkes-Barre, Pa. vi

Books and Periodicals:
Allen, Lane & Scott, Philadelphia 148
Baird's Books for Practical Men 148
Blake, J. A., Denver, Col. 148
Spon, E. & F. N., New York 148
Stechert, E., New York 148
Capital and Labour ..... —
El Minero Mexicano v
La Houille iv
Teknisk Tidskrift iv
Van Nostrand's Eclectic Engineering Magazine 148
Van Nostrand's Science Series 148

Cement:
Anderson, Merchant & Co., New York .. i
Brand, James, New York v
Fleming, Howard, New York 148

Coal:
Berwind, White & Co., New York vi
Borda, Eugene (Koh-i-noor Coal), Phila. vii
Borden & Lovell, New York vi
Brown, S. H. & Co., New York vi
Cannelton Coal Co., Philadelphia, Pa. .. vii
Coxe, Bros. & Co., New York vii
Detmold & Cox, New York vi
Heissenbuttel & Wells, New York vii
Hoboken Coal Co., New York vii
Kittaning Coal Co., Philadelphia, Pa. vi
Lehigh Valley Coal Co., New York vi
Lehigh & Wilkes-Barre Coal Co., N. Y. .. vii
Maryland Coal Co., New York vii
Pardee & Co., New York vii
Pennsylvania Gas Coal Co., New York .. vii
Phila. & Read. Coal & Iron Co., Phila., Pa. vi
Swords, A. S., New York vi
Williams, R. H., New York vii

Coal and Ore Separators:
Bradford, H., Philadelphia, Pa. v
Fraser, Chalmers & Co., Chicago, Ill. iv
Krom, Stephen R., New York ii
Wetmore, George C., New York ii

Engineers and Chemists:
Courtis, Wm. M., Wyandotte, Mich. v
Endres, John J., New York v
Hale, A. W., New York v
Hill, John W., Hamilton, O. v
Keyes, W. S., San Francisco, Cal. v
Morton, J. H., Salt Lake City, Utah v
Nicolls, W. J., Baltimore, Md. v
Rothwell, R. P., New York v
Stetefeldt, C. A., San Francisco, Cal. v
Wilson Bros. & Co., Philadelphia, Pa. v
Wurtz, Henry, Hoboken, N. J. v
Foot & McNulty, New York 148
Blast Furnace Chemist, Boston 148

Engineer's Instruments:
Edgerson, N. H., Philadelphia, Pa. 147
Heller & Brightly, Philadelphia, Pa. iv
Instruments for Sale viii

Engravers:
Crosscup & West, Philadelphia, Pa. v

Fire Brick:
Kriescher, B. & Son, New York 147
Mauer, Henry, New York v
Valentine, M.D. & Bro., Woodbridge, N.J. v

Gas Process:
Stevens, S. A. & Co. (Lowe Process), N.Y. ii

Gas Works' Machinery:
Morris & Tasker, New York iii

Hot Blast Stoves:
Whitwell's 147

Hydraulic Jacks and Punches:
Dudgeon, Richard, New York v
Lyon, E., New York v

Locomotives:
Burnham, Parry, Williams & Co, Phila. v

Machinists' Tools:
Bement, Wm. B., Philadelphia, Pa. 147

Mining, Crushing, Stamping and Smelting Machinery:
Ball's Steam Stamping, Holyoke, Mass. .. iv
Baugh & Sons' Ore Mill, Phila., Pa. iii
Blake's Crushing & Ore Breaking, New Haven, Conn. iv
Copeland & Bacon, N. Y. viii
Council Bluffs Iron Works, Iowa iv
Crane Bros. Mfg. Co., Chicago, Ill. iv
Delamater Iron Works, New York viii
Frisbie & Co., D., New Haven, Conn. iv
Fraser, Chalmers & Co., Ill. iv
Hartford Foundry & Machine Co., Conn. iv
Krom, Stephen R., New York ii
Lane & Bodley Co., Cincinnati, Ohio v
Morey & Sperry, New York viii
Morgan Iron Works, New York iv
Rogers, H. A., New York i
Philadelphia Hydraulic Works, Phila. ... iii
United Royal Smelting Works 148

Pumps:
Carr, A., Selden Direct-Acting N. Y. ii
Clayton, James, Brooklyn, N. Y. iii
Crane Bros. Mfg. Co., Chicago, Ill. ii
Delamater Iron Works, New York viii
Harris Steam Pump, New York iii
Knowles Steam Pump Works, N. Y. iii
Niagara Steam Pump Works, Brooklyn, N. Y. 147
Norwalk Iron Works Co. 147
Worthington, H. R., New York ii

Railroads & Transportation Lines:
Pennsylvania Railroad vi

Roofs, Girders, etc.:
Dwight, G.W., jr. & Co., Spr'gfield, Mass. iii
Scaife, Wm. B. & Sons, Pittsburgh, Pa. .. 147

Rock Drills:
Am. Diamond Rock Boring Co., N. Y. viii
Burleigh Rock Drill, New York i
Delamater Iron Works, New York viii
Rand & Waring Drill & Comp. Co., N.Y. viii

Rubber and Belting:
Gutta Percha and Rubber Co., The, N.Y. ii
New York Belting and Packing Co. ii

Steel Works:
Crescent Steel Works, Pittsburg, Pa. vi
Edgar Thompson Steel Co., Pittsb'g Pa. 148
Park Bros. & Co., New York, Boston, Pittsburg and Cincinnati vi
Pittsburg Steel Casting Co., Pittsb'g, Pa. i

Tubes and Pipes:
Abendorth & Root Mfg. Co., New York .. viii
Morris, Tasker & Co., New York iii
National Tube Works Co., Boston, Mass. iv
Worthington, H. R., New York ii

Ventilators:
Murphy, Francis, Philadelphia, Pa. v

Wanted and For Sale:
Blast Furnace Chemist, Boston 148
Engineering and Mining Journal—Vols. for Sale viii
Kanawha Coal Lands i
Manganese i
Mining Engineer Wanted 147
Situation Wanted as Mining Engineer .. 147
Situation Wanted by a Graduate Eng'r. —

Wire Rope:
Halladie, A. S., San Francisco, Cal. iii
Hazard Mfg. Co., Wilkes-Barre Pa iii
Mason, John W. & Co., New York i
Roebling, John A., Trenton, N. J. iii

Miscellaneous:
Incombustible Mineral Wool. 147
Vickery, P. O., Augusta, Maine 147
Riley, Henry A. vii
Van Deventer & Patton 147

Gold and Silver Stocks.

NEW YORK, FRIDAY EVENING, March 2, 1877.

The *bona fide* dealings in mining stocks in this city are very limited, the great majority of what we called "transactions" being merely "mock" or "washed" sales, but there are indications of a greater interest developing in mining investments, and we have learned of several important sales. The Seaton Consolidated Company, of Colorado, which has been placed upon the American Board this week, and has sold from $2.50 up to $4, with fair transactions, will probably become a prominent stock. We particularly note this company because the sales have, we understand, been legitimate, no other being allowed. Some transactions have been made in Merrimack, which, is declaring regular dividends on a moderate capital. There is, on the whole, a better feeling towards mining investments, and if those in charge of the Mining Stock Board could only appreciate the fact that a strictly legitimate business, be it ever so small, in good mines will create more interest among investors than can possibly be excited by any amount of washed or dishonest transactions in worthless stocks, there would soon spring up a greatly improved business. The California stocks are, as a rule, wisely let alone, and are thrown about among the brokers on washed sales in the endeavor to entrap some unwary outsider into parting with his money. The Grant, which we had occasion to warn investors against and which was the most conspicuous example of disreputable dealings, has nearly run its course. After having been worked up from $2 to, we believe, $9, it has declined to about $1, and will doubtless disappear altogether before long. We understand the broker who manipulated the sales has been expelled from the Board because he refused to take 100 shares of the stock at the figures he had offered for it.

We shall shortly give some notes on several of the mines which promise to become prominent in our transactions.

NEW YORK MINING STOCK EXCHANGE.

This board has received about 50 new members from the New York Gold and Stock Exchange since the 1st of February. We are informed that an increased interest is taken in the operations of the board while the attendance is more regular. The transactions for the week are given as follows: 6,200 shares of Lacrosse Gold Mining Company's stock, at from 28 to 31 cents per share; 900 shares of Bobtail Gold Mining Company, at from $1.40 to $1.50 per share; 400 shares of Atlantic Copper Mining Company's stock, at from $7 to $7.25 per share.

The National Mining and Exploring Company will hold its annual meeting on the 19th inst.

The Idaho Gold Mining Company, Grass Valley, California, has declared its nineteenth dividend of $7.50 per share, aggregating $23,250.

The Merrimac Silver Mining Company announces its usual monthly dividend of one per cent., payable on the 10th inst.

Sherbrooke Gold Mining Company.—This company will hold its annual election on the 7th inst.

Aloyez Mining Company.—We note an auction sale of 500 shares of the stock of this company on the 24th ult., at $1 per share.

INCORPORATIONS.

We note the recent organization of the following mining companies in addition to the announcements in our issue of Jan. 27:

Name of Company.	Location.	Cap. Stock.
Butte Basin Gravel Mining Co.	California.	$5,000,000
Ione Coal and Iron Co	"	4,000,000
Golden West Gold Mining Co.	"	3,000,000
Signet Silver Mining Co.	"	10,000,000
Baltimore Quartz Mining Co.	"	2,500,000
Murchie Gold and Silver Mining Co.	"	1,000,000
California Mining Co.	California.	650,000
Sparrow-Hawk Mining Co.	"	300,000
Beck Gold, Mill and Mining Co.	"	600,000
East Keystone Mining Co.	"	70,000
Ada Livingston Gold Mining Co.	"	60,000
Arizona Mining and Milling Co.	"	10,000,000
Silver Queen Mining Co.	"	10,000,000
Peacock Mountain Silver Mining Co.	"	6,000,000
Pride of Nevada Consolidated Mining Co	Nevada.	18,000,000
United States Consolidated Gold & Silver Mining Co.	"	10,000,000
Toquerville Mining Co.	Utah.	6,000,000
Black Hill Gold Mining Co.	Dakota Ter.	.....
Commonwealth Iron Co.	Mich.	.....
Gold Coin Mining Co.	Colorado.	.....
Watt Blue Gravel Mining Co.	Nevada.	1,000,000
Wide-awake Prospecting Co.	Arizona.	1,000,000
Brush Creek Mill and Mining Co.	California.	100,000

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING March 1, 1877.

The market on copper is weak and dull; the drop in ingot copper has had a marked effect on prices. Calumet is offered 4½ per share. Franklin is offered at 12, with a nominal bid of 11. Quincy is steady at 43 bid. There is a pretty strong demand for Pewabic. The annual meeting occurs within a few weeks, and there is a strong opposition to the present management. The advance in the price of the stock is occasioned probably by one or the other parties buying to strengthen their side. Duncan is firm and steady, closing 6 bid. Those parties who thought it would break with the rest of the market and acted thereon, hav'nt seen any profit yet. Pethwick is offered at 30c. and 20c. bid. Although there are rumors of assessments, the Treasurer states that he will not advise calling any yet. In the small coppers nothing.

Copper Shipments.—The *L'Anse News*, of the 24th ult., reports the following shipments of copper from January 22nd to February 23, 1877, inclusive. Calumet & Hecla, 623 tons 31 lb.; Central, 86 tons 471 lb.; Atlantic, 123 tons 1,290 lb.; Phœnix, 67 tons 1,414 lb.; Franklin, 143 tons 240 lb.; Osceola, 122 tons 805 lb; Allouez, 80 tons 1,210 lb.; Pewabic, 12 tons 1,660 lb. Total about 1,256 tons.

Gas Stocks.

NEW YORK, FRIDAY EVENING, Mar. 2, 1877.

Gas stocks are generally lower and the tendency downward. The market is very quiet.

Lynn, Mass., Gas Company.—We are reported recent transactions in the stock at $85 per share.

Dorchester, Mass., Gas Company.—Our Boston correspondent reports a sale of 25 shares of this stock at $90 per share.

The Gas Supply of New York.—The Gas Commission met at the City Hall yesterday for the purpose of opening bids for furnishing the city with gas, from the 1st of April until the end of the year. In consequence of the sickness of Commissioner Campbell the bids were not opened. A communication was received from the Municipal Gas-Light Company, making water-gas by the Tessié du Motay Process, stating that it is their intention to lay mains as soon as possible and put themselves in a position to bid for city work at a cost not greater than $26 per lamp. The company is anxious to have the permission to lay mains as soon as possible. Another meeting of the commission will be held on the 5th inst.

COUPONS AND INTEREST are due on the bonds of the following companies during the present month:

Baltimore Gas-Light Company.—Coupons.

Central Gas-Light Company.—Coupons.

Champlain and Urbana Gas-Light and Coke Company.—Coupons.

Citizens' Gas Company, of Rochester, N.Y.—Coupons.

Laclede Gas-Light Company, of St. Louis, Mo.—Coupons.

Westchester Gas Company.—Coupons.

The Oakland, California, Gas Company has increased its capital stock to $3,000,000.

The Boston Gas Company announces a dividend of 2½ per cent., aggregating $62,500. Recent transactions in this stock have been made at $805 per share.

Northern Liberties Gas Company.—The dividend period of this company will occur during the present month.

San Francisco Gas Company.—We note recent sales of 500 shares of the stock of this company at from $113 to $113¼ per share.

Worcester, Mass.—The cost of lighting the streets of this city during the year 1876 amounted to $26,954.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Divid.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.	$5,000,000	$ 100	2½	Jan. '77	101	103½
" " Bonds	90,000	1,000	†3½	Feb. '77		109
NewYork, "	4,000,000		5	Nov. '76	130	132
Metropol. "	2,500,000	100	5	Sep. '76	140	144
" " Certf.	1,000,000	....	3½	" "	102	—
" " Bonds	500,000	1,000	3½	Dec. "		102½
Harlem "	1,850,000	50	4	Feb. '77	104	—
Manhattan "	4,000,000	50	10	Dec. "	219	225
Brooklyn, B'klyn.	2,000,000	25	5	Nov. '76	168	172
Nassau "	1,000,000	25	4	Jan. '76	80	—
" " Certf.	700,000	1,000	3½	Nov. '76	93	—
People's "	1,000,000	10	3½	Jan. '76	46	52
" " Certf.	300,000	1,000	3½	July '76	84	90
" " Bds	325,000	....	3	Feb '77	90	96
Metropol. "	1,000,000	10	3½	Nov. '76	76	80
Wmsburgh "	1,000,000	50	3	Oct. '76	130	—
" " Certf.	1,000,000	....	3½	July "	99	102
Citizen's "	1,200,000	20	2½	Jan. '76	99	102½
" " Certf.	320,000	1,000	3½	Oct. "	98	102
J. C. N.J.	750,000	20	5	July, '75	160	—
Centl. Westch. N.Y.	466,000	50	4	July. "	90	—
Subur'n " "	295,000	50	3½	Oct. 1, '76	90	100

† Gold.

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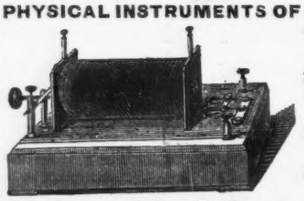

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